It's About Time: A Sociolegal Approach to Intergenerational Climate Justice in the United States, with Developments in Environmental Justice Scholarship, Climate Change Litigation, and Climate Adaptation Law

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Abstract

This interdisciplinary dissertation engages in sociolegal studies to analyze the ethical and legal obligations of the United States federal government with respect to its honoring of intergenerational climate justice. With that, this dissertation accomplishes three broad objectives. First, it engages in sociological theory to extend environmental justice scholarship by framing rising and future generations as a voiceless and oppressed faction of society and placing them within the long environmental justice history in the United States. Next, it integrates this unique perspective and ethical recognition with legal analysis, by examining some of the most prominent legal efforts striving to compel the federal government to mitigate and prepare for the impending and disproportionate impacts of anthropogenic climate change. The combined sociolegal studies make clear that the intent, purpose, and function of the tripartite federal government system—and the social institution of law as a whole—work in tandem to prevent intergenerational climate injustices from occurring by ensuring the protection of the interests of rising and future generations from the exploitative actions of the federal government of this present generation. Last, this dissertation uses resilience thinking to synthesize the findings from the sociolegal studies and to advance practical solutions for the development of climate adaptation law in the United States.

Acknowledgements

To my committee: First, thank you Professor Sowards for your ever-insightful instruction, stimulating collaboration, and love of writing, which has pushed me to sharpen my thinking, research, and writing to what it has become today. Next, thank you Professor Seamon for the years of excellent instruction, patient support, and consistent encouragement throughout my research. Next, thank you Dean Becker for your wise counsel, valuable guidance, and always thoughtful feedback. Last, thank you Distinguished Professor Cosens. From my first year of law school to the completion of this dissertation, you have been there for me as both an inspiration and mentor in my academic endeavors at the intersection of law, science, and society.

Dedication

This dissertation is dedicated to my best friend and wife, Jessica, and to our three boys: Danny, Brody, and Brooks. As always, thank you for your enduring love and support.

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Introduction: Presenting the Intergenerational Issue

The governments failed to respond properly to the dramatic challenge of our climate crisis. Our generation, the least responsible for the acts of the polluters, will be the ones to see the most devastating impacts of climate change. World leaders are losing the window to act, but we are not gonna [sic] stand still watching their inertia.

— Greta Thunberg, March 15, 2019[1]

Sixteen-year-old Greta Thunberg delivered these words at the first ever youth-led, global climate strike.[2] On that day, an estimated 1.6 million youth from over 130 countries gathered to protest their respective governments in an attempt to influence political action sufficient to mitigate the imminent impacts of climate change.[3] "I don't want you to listen to me," Thunberg later testified as she sat before a joint committee of the House of Representatives on Capitol Hill, "I want you to listen to the scientists."[4] She supplemented her demands by gently sliding across the witness table a crumpled copy of the Intergovernmental Panel on Climate Change (IPCC) *Special Report on Global Warming of 1.5°C*, or "*SR15*", to be submitted for the record.[5] Her words were simple, yet her message contained compelling implications. That is, for the United States federal government to heed and act responsibly to the dire warning that status quo humanity has approximately a sixty-six percent chance of meeting a 1.5°C (2.7°F) global temperature

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1. Alejandra Borunda, *These Young Activists are Striking to Save Their Planet From Climate Change*, National Geographic, https://www.nationalgeographic.com/environment/2019/03/youth-climate-strike-kids-save-the-world/ (Mar. 13, 2019).

2. *See* Time Magazine, *'Now I Am Speaking to the Whole World.' How Teen Climate Activist Greta Thunberg Got Everyone to Listen*, https://time.com/collection-post/5584902/greta-thunberg-next-generation-leaders/ (last visited Dec. 10, 2019). Thunberg, since the beginning of 2018, has skipped school on every Friday to display a handmade sign with the words *Skolstrejk for Klimatet* ("School Strike for Climate") in front of the Swedish parliament in Stockholm. Thunberg's social media popularity elevated her as an icon for the youth-led, climate movement, and she was later named Time's 2019 *Person of the Year. See https://time.com/person-of-the-year-2019-greta-thunberg/.*

3. Washington Post, *Students around the world skip school to protest and demand action on climate change*, May 24, 2019, https://www.google.com/amp/s/www.washingtonpost.com/education/2019/05/24/students-around-world-skip-school-protest-demand-action-climate-change/%3foutputType=amp. (last visited Dec. 10, 2019).

4. House Hearing on Climate Change, Sept. 18, 2019, https://www.c-span.org/video/?464405-1/youth-activists-urge-lawmakers-action-climate-change&vod deliver a special address to Congress (last visited Dec. 10, 2019).

5. *See Id*.

increase of preindustrial levels within just twelve years (now, as of the writing of this dissertation, within less than ten years).[6] (*See* Figure 1.1).[7]

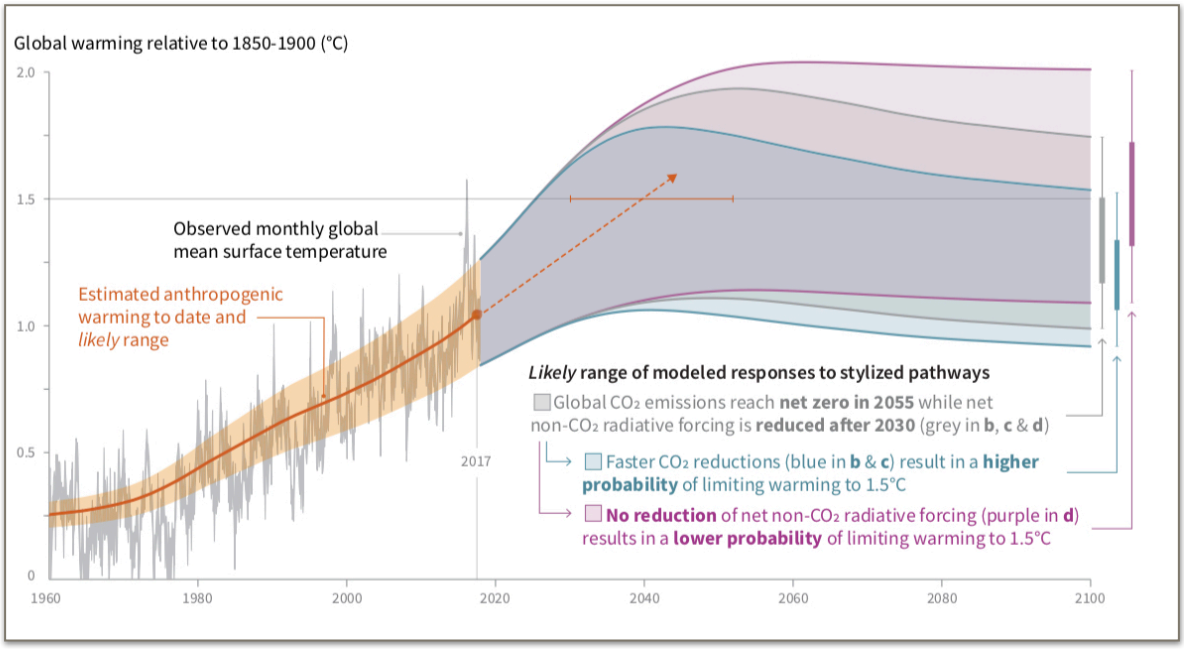

Figure 1.1 *SR15*'s central model depicts "[o]bserved global temperature change and modeled responses to stylized anthropogenic emissions and forcing pathways." With calibrated language to communicate scientific certainty, this model illustrates the collective reduction of CO_2 emissions necessary within the next thirty years—ultimately reaching net zero by 2055—to keep global warming under 1.5°C.[8]

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[6]. IPCC, *Special Report: Global Warming of 1.5 ºC*, https://www.ipcc.ch/sr15/ (last visited Dec. 10, 2019). SR15 was requested by the world governments under the Paris Agreement to focus on how risk levels change from 1.5°C to 2°C of global warming. It was drafted and edited by ninety-one scientists from forty nations who analyzed over 6,000 scientific studies. The latest IPCC findings confirm Earth is likely to reach 1.5°C warming in the early-to-mid 2030s. See IPCC, 2021: Summary for Policymakers. In: *Climate Change 2021: The Physical Science Basis*, Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press.

[7]. NASA, *Scientific Consensus: Earth's Climate Is Warming*, https://climate.nasa.gov/scientific-consensus/; *see also* Samantha Harrington, *Causes of global warming: How scientists know that humans are responsible*, https://yaleclimateconnections.org/2020/03/causes-of-global-warming/ (March 27, 2020).

[8]. *Id*. Real-time temperature rise can be tracked here: http://globalwarmingindex.org.

SR15 unfurls the frightening ramifications that entail crossing the 1.5°C threshold. According to *SR15*'s authors, many socio-ecological systems will cross critical tipping points of no return, triggering vicious cycles of climate feedbacks, ultimately leading to an irreversible transition to a hotter Earth.[9] In addition to projecting the cost of climate-related damage at $54 trillion, overshoot scenarios indicate the devastating outcomes that await the regions that have the lowest adaptive capacities.[10] Hundreds of millions of people will lack the adequate ability to cope with the harsh consequences caused by the drastic shift to a state of prolonged temperature, weather, and climate extremes.[11] With respect to the future of humanity, *SR15* largely expounds upon the ominous reality that it will be the youngest among the poorest and most vulnerable communities who experience the most devastating impacts.[12]

This bleak notion—that those most vulnerable among the rising and future generations are set to pay the ensuing price of climate-related damages, despite being those least responsible for its causes—was at the heart of Thunberg's humble plea for fairness before Congress. Her message, and subsequent call for a show of solidarity from the steps of the U.S. Supreme Court, resonated with millions of people ranging from every continent around the globe.[13] The following Friday, on September 20, 2019, the

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[9]. *See* IPCC, *Special Report: Global Warming of 1.5 ºC; see also* Timothy Lenton, *Climate tipping points — too risky to bet against*, April 9, 2020 https://www.nature.com/articles/d41586-019-03595-0 ;

[10]. *See* IPCC, *Special Report: Global Warming of 1.5 ºC*, Chapter 3, https://www.ipcc.ch/sr15/ (last visited Dec. 10, 2019).

[11]. The harsh consequences include lack of food security and water availability—including rising sea levels, loss of reefs, hurricanes, floods, droughts, desertification, fire, species loss, with differing severity impacts depending upon locality. *See* David Wallace-Wells, *The Uninhabitable Earth: Life After Warming*.

[12]. UNICEF, *Unless we Act Now: the Impact of Climate Change on Children*, (2015) https://www.unicef.org/publications/files/Unless_we_act_now_The_impact_of_climate_change_on_children.pdf.

[13]. Valerie Volcovici, Y*outh climate activists to join Sweden's Thunberg in protest at U.S. Supreme Court*, Reuters, https://www.reuters.com/article/climate-change-thunberg-congress/youth-climate-activists-to-join-swedens-thunberg-in-protest-at-u-s-supreme-court-idINL2N2682AJ.

#FridaysForFuture campaign recorded over 4 million strikers in more than 160 nations.[14] Perhaps the message resonated with some because they were the ones who lived on the frontlines of climate breakdown and realized that the warmest decade on record was a direct consequence of human actions of the distant past.[15] The following week, over 7 million people in total joined.[16] Others might have participated because they recognized that maintaining humanity's ever-increasing extractive fever will inevitably exacerbate disproportionate impacts and make existing inequities even worse for the future.[17] By the year's end, the number reached over 13 million.[18] In solidarity, they all gathered for one cause—to demand immediate action from world leaders to curtail the rapid hurtle toward climate catastrophe.

Yet, despite the scientific consensus that rising and future generations are up against ecological limits;[19] despite the rapid rise of public opinion of perceived

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[14]. Valerie Volcovici, *Greta Thunberg to U.S. Congress on climate change: 'Wake up'*, Sept. 18, 2019 https://www.reuters.com/article/us-climate-change-thunberg-congress/greta-thunberg-to-congress-dont-listen-to-me-listen-to-the-scientists-idUSKBN1W31CM; *See also* #fridaysforfuture, https://www.fridaysforfuture.org (last visited Dec. 10, 2019); *see also* USA Today, *Friday's global strike was likely the largest climate rally ever*, https://www.google.com/amp/s/amp.usatoday.com/amp/2401672001 (last visited Dec. 10, 2019); *see also* The Guardian, *Global climate strike: Greta Thunberg and school students lead climate crisis protest – as it happened*, https://www.theguardian.com/environment/live/2019/sep/20/climate-strike-global-change-protest-sydney-melbourne-london-new-york-nyc-school-student-protest-greta-thunberg-rally-live-news-latest-updates (last visited Dec. 10, 2019).

[15]. According to NASA, NOAA, and the UK Met Office, the ten years to the end of 2019 have been confirmed as the warmest decade on record—dating back to 1850. *see* Matt McGrath, *Climate Change: Last Decade Recorded as Warmest on Record*, (15, Jan. 2020) https://www.bbc.com/news/science-environment-51111176.

[16]. *See* 350.org, *7.6 million people demand action after week of climate strikes*, (Sept. 28, 2019) https://350.org/7-million-people-demand-action-after-week-of-climate-strikes/.

[17]. *See* UNICEF, *Unless we act now: The impact of climate change on children Executive summary* (2015) https://www.unicef.org/publications/files/Unless_we_act_now_The_impact_of_climate_change_on_children.pdf; This includes impacts to young peoples' health and housing, with disproportionate risks to the poor, women, and indigenous.

[18]. *See* #fridaysforfuture, https://www.fridaysforfuture.org (last visited Dec. 10, 2019). By early 2020, the physical gathering of the global climate strikes came to an abrupt halt due to the global pandemic brought about by the spread of COVID-19. *See* Paul Hockenos, *Shifting Gears: The Climate Protest Movement in the Age of Coronavirus*, (Mar. 26, 2020) https://e360.yale.edu/features/shifting-gears-the-climate-protest-movement-in-the-age-of-coronavirus.

[19]. The World Health Organization, UNICEF, and the medical journal *The Lancet* confirm that the health and future for every child and teen in the United States and throughout the world is under threat, and there is an uncertain future for children. *See* The Lancet Commissions, *A future for the world's children? A WHO–UNICEF–Lancet Commission,* https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(19)32540-1/fulltext#seccestitle10.

importance and physical demonstrations of solidarity;[20] and despite the enhanced public discussions[21] and attempted political actions[22] to address the nuances of the problem, the political branches of the United States federal government still actively maintain the status-quo.[23] They continue taking actions—namely, by authorizing, promoting, and subsidizing the development of the fossil fuel industry—that are significantly compounding the imminent cascade of consequences leading to the disproportionate downfall of its own current and future citizens.[24] The federal government's actions raise an array of ethical and legal questions of intergenerational climate justice, and this dissertation engages in sociolegal studies and resilience thinking to analyze them.[25]

The array of questions are consolidated into three general inquiries, which flow as follows: (1) whether the federal government of this generation is obligated to account for

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[20]. Matthew Taylor, *Climate crisis seen as 'most important issue' by public, poll shows*, (Sept. 18, 2019) https://www.theguardian.com/environment/2019/sep/18/climate-crisis-seen-as-most-important-issue-by-public-poll-shows.

[21]. There was an increase in both the quality and quantity of media coverage. *See* Michael Svoboda, *Media coverage of climate change in 2019 got bigger – and better*, Yale Program on Climate Change Communication (Mar. 10, 2020) https://yaleclimateconnections.org/2020/03/media-coverage-of-climate-change-in-2019-got-bigger-and-better/.

[22]. *See* Anthony Leiserowitz et. al., *Politics & Global Warming, March 2018*, Yale Program on Climate Change Communication, (May 8, 2019) https://climatecommunication.yale.edu/publications/politics-global-warming-march-2018/2/. (*explaining* that prior to the 2020 election, climate change has barely registered as an issue in any US presidential election, but now democratic candidates have embraced climate change in a new way).

[23]. A primary issue is that the leadership of one of the United States' two major political parties uniformly denies even the existence of human-induced climate change. But, even under bipartisan leadership, there continues to be an annual multi-billion dollar production subsidy to the fossil fuel industry. As of the writing of this footnote (2021), the United States remains the lead oil and gas producer in the world. *See* EIA, *The U.S. leads global petroleum and natural gas production with record growth in 2018, (Aug. 20, 2019)* https://www.eia.gov/todayinenergy/detail.php?id=40973#:~:text=The%20United%20States%20surpassed%20Russia,world's%20largest%20producer%20of%20petroleum.&text=The%20United%20States%20also%20produced,equivalent%20to%205.8%20quadrillion%20Btu.

[24]. *See* Fourth National Climate Assessment, *Volume II: Impacts, Risks, and Adaptation in the United States*, https://nca2018.globalchange.gov (last visited Dec. 10, 2019); *See Dirty Energy Dominance: Dependent on Denial: How the U.S. Fossil Fuel Industry Depends on Subsidies and Climate Denial*, http://priceofoil.org/2017/10/03/dirty-energy-dominance-us-subsidies/ (last visited Dec. 10, 2019) (*stating* that the federal government provides an annual $14.7 billion production subsidy to the oil, gas, and coal industries).

[25]. *See generally* Anthony Walsh and Craig Hemmens, *Law, Justice, and Society: A Sociolegal Introduction*, 4th Ed., Oxford University Press (2016). Intergenerational climate justice is the phrase used in this dissertation with regards to the federal government of this present generation's collective and disproportionate responses to the interests of rising and future generations in the face of accelerating climate change.

its contribution to the disproportionate allocation of climate harms and burdens imposed on rising and future generations; (2) If so, by what ethical and legal standards is the federal government required to evaluate its imposition of these risks?; and (3) whether the federal government is constrained in its political and legal decision-making, and, if so, what steps must it actively take in order to honor these demands of intergenerational climate justice.

This dissertation concludes that, because the federal government's contributions to the climate crisis presents a cross-generational conflict of interest—with disproportionate effects imposed primarily on the interests of rising and future generations, the federal government is indeed obligated to account for its contribution to the conditions that are constitutive of their interests.[26] With that, and regardless of the political majority in power at any given moment, political actors are constrained within an ethical and legal decision-space of intergenerational climate justice, whereby sufficient mitigatory and adaptive measures must be actively pursued. This sociolegal recognition of intergenerational climate justice needs to be emphasized and implemented within the existing institutions of American political and legal life and facilitated under flexible, resilient, and adaptive governance structures.

To that end, this dissertation proceeds in seven chapters. Chapter 1 builds upon the descriptive narrative set forth in this introduction, by detailing why and how rising and future generations are marginalized and largely invalidated in the United States' political system. This unique perspective of youth oppression and climate justice as oriented as forward in time is then linked to the long environmental justice history in the United States. After the ethical recognition of intergenerational climate justice is established, the stage is then set for the series of legal analyses that follow. Chapter 2 delves into the indigenous fight for intergenerational climate justice, and it contemplates

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[26]. Triggering various aspects of distributive justice, public trust obligations, fundamental rights, along with many other positive laws and regulations. The public trust doctrine is a longstanding legal paradigm that expresses the obligations the government of this present generation bears to those who will come after—often understood as the legal doctrine to preserve public goods and resources for rising and future generations. *See generally* Charles F. Wilkinson, *The Headwaters of the Public Trust: Some Thoughts on the Source and Scope of the Traditional Doctrine*, 19 ENV'T L. 425, (1989).

the subsistence way of life of the Alaskan Natives of the Northern Bering Sea—whose rising and future generations are arguably among those most vulnerable to the severe consequences of a rapidly warming Earth. This chapter critiques the federal government's political and legal responses to the Bering Sea Natives' persistent plea for preservation and meaningful voice while they face this already onset climate change. With that, this chapter concludes that the federal government remains bound within an ethical and legal decision-space and can neither legislate away its requirements nor may the executive use its discretion to take actions that disproportionately diminish the rising and future generation of Bering Sea Natives' interests.

From there, Chapters 3 and 4 analyze, respectively, the substantive and procedural aspects of the preeminent (what is called "strategic"[27]) climate change litigation case, *Juliana v. United States*. This is the landmark constitutional and public trust[28] lawsuit filed in 2015 by twenty-one youth plaintiffs that has (as of the completion of this dissertation) the legal potential to prevent the United States from authorizing and supporting the development and use of fossil fuels. Together, these chapters identify the legal viability of the judicial branch to offer an overarching mandate to secure the demands of intergenerational climate justice for the benefit of all rising and future generations, which declaration of law cannot be overlooked, ignored, or rejected by future presidential administrations or political majorities. Next, Chapter 5 inspects the federal government's coal leasing business within the Powder River Basin, which is the geologic region on public lands that contains the largest coal reserves in the United States. This analysis exposes some of the discrete tactics that the Bureau of Land Management (BLM) has used to successfully suppress, downplay, and even outright

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[27]. There are two broad types of climate justice litigation cases: *strategic* and *routine*. "Strategic cases are designed to press national governments to be more ambitious on climate or to enforce existing legislation. *See* Joana Setzer & Rebecca Byrnes, *Global Trends in Climate Change Litigation: 2019 Snapshot*, *Policy Report July 2019*, Grantham Research Institute on Climate Change and the Environment and the Centre for Climate Change Economics and Policy, https://www.cccep.ac.uk/wp-content/uploads/2019/07/GRI_Global-trends-in-climate-change-litigation-2019-snapshot-2.pdf.

[28]. In 1970, Joseph Sax ushered in a new era of scholarship on the public trust doctrine in his seminal work, *The Public Trust Doctrine in Natural Resources Law: Effective Judicial Intervention*.

ignore the best available science concerning the projected impacts of its actions imposed on rising and future generations. This analysis also exposes how the federal court system has allowed for the BLM to successfully fail in its efforts to comply with the Nation's bedrock environment law—that is, the National Environmental Policy Act (NEPA).

Building upon Chapter 5, Chapter 6 initiates a comprehensive mixed methods analysis of every NEPA (collectively called "routine"[29]) climate change litigation complaint ranging from the beginning of 2015 to the end of 2019. This analysis indicates a systematic pattern of compliance failures undertaken by multiple federal government agencies (including and especially the BLM), and it pinpoints many of the major, yet unaccounted for, aggregate actions that are contributing to the disproportionate imposition of climate harms and burdens facing rising and future generations. In Chapter 7, the findings from the collective sociolegal studies then merges with resilience theory to serve as guidelines for the development of climate adaptation law in the United States. This final chapter emphasizes the importance of integrating the systematic use of resilience assessments under NEPA, to facilitate a rapid and unified response to the impacts of the climate crisis all while enabling states, tribes, local governments, and other stakeholders to advance practical applications to solve their own unique socio-ecological system issues for the intentional outcome of intergenerational climate justice.

The sociolegal approach of this dissertation recognizes law as a social institution, which fits into and shapes other institutions—just as law itself is shaped by broader institutional and cultural forces—and seeks to further understand the relationship of law to society and both to justice.[30] Altogether, this sociolegal approach is meant to expand, connect, and advance interdisciplinary knowledge and discussions concerning climate change and government responsibilities in the context of rising and future generations. Some important concepts that string throughout this dissertation, which deserve further research, include: that both systemic structures of injustices and core government

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[29]. "Routine planning and regulatory cases are increasingly including climate change arguments, exposing courts to climate science and climate-related arguments even where incidental to the main claim." See *Global Trends in Climate Change Litigation: 2019 Snapshot*, *Policy Report July 2019.*

[30]. *See generally* Anthony Walsh and Craig Hemmens, *Law, Justice, and Society: A Sociolegal Introduction*, 4th Ed., Oxford University Press (2016).

obligations span the generations; that rising and future generations are both subjects of oppression and agents of social, political, and legal change; that interdisciplinary scholarship, social movements, and legal action work in tandem to influence public worldviews, votes, policy, and laws; and—which may perhaps be one of the most pressing issues as of the writing of this dissertation—the fervent need to amplify public trust and government reliance on science and expert analysis that can readily demonstrate accurate predictions of the truth of current and future reality based on limited information and in the face of uncertainty.[31] Overall, this research seeks to inspire action-forcing change in the policies and laws of the United States to better align with socio-ecological system reality, all in the pursuit of achieving intergenerational climate justice.[32]

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[31]. There are many other questions of intergenerational equity and justice that extend beyond the purview of this dissertation. For example: looking to reparations for the past; balancing other needs and disparities of the present; questions about non-identity, including abortion; and considerations of the more-than-human world—including ecosystems as well as the built environment.

[32]. For more on the social and legal impact potential of research and academic discourse, *see* Holly Doremus, *The Rhetoric and Reality of Nature Protection: Toward a New Discourse*, 57 Wash. & Lee L. Rev. 11 (2000), https://scholarlycommons.law.wlu.edu/wlulr/vol57/iss1/3.

Chapter 1: Toward a Decolonized Future: Establishing Critical Context and an Ethical Recognition for Intergenerational Climate Justice

The natural distribution is neither just nor unjust; nor is it unjust that persons are born into society at some particular position. These are simply natural facts. What is just and unjust is the way that institutions deal with these facts.

—John Rawls, 1971[33]

I. Introduction

The United States federal government of the present generation exercises asymmetrical power over rising and future generations—because its actions can negatively influence the circumstances that create the conditions of disproportionate harms and burdens—while rising and future generations cannot exercise such power inversely.[34] Within the United States' existing system of representative democracy, rising and future generations under the age of eighteen do not have the voting power sufficient to influence the political actions that shape the conditions of their future interests.[35] In turn, rising and future generations seemingly lie at the mercy of arbitrary representation of elected persons who represent the political majority of the present, adult generations,

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[33]. John Rawls, *A Theory of Justice*, Cambridge, MA: Harvard University Press. Revised edition, 1999.

[34]. *See generally* Barry, 1999, "Sustainability and Intergenerational Justice", in *Fairness and Futurity. Essays on Environmental Sustainability*, Andrew Dobson (ed.), Oxford: Oxford University Press, 93–117. (*explaining* that this is just the same as the present has no power over past generations); see also Hoegh-Guldberg, Ove, Daniela Jacob, and Michael Taylor, 2019, "Chapter 3: Impacts of 1.5°C of Global Warming on Natural and Human Systems" in IPCC 2019: 244; The most significant health risk factor to a young person's health in the United States is air pollution, and that threat is projected to get worse in the future because of climate change. *See* Perera F., *Pollution from Fossil-Fuel Combustion is the Leading Environmental Threat to Global Pediatric Health and Equity: Solutions Exist*, Int J Environ Res Public Health. 2017 Dec 23;15(1), available at https://www.ncbi.nlm.nih.gov/pubmed/29295510; *see also* UN Environment Program, *Air pollution: know your enemy*, (2018), https://www.unenvironment.org/news-and-stories/story/air-pollution-know-your-enemy; *see also* https://www.pnas.org/content/116/13/6001 (*explaining* that air pollution exposure is the largest environmental health risk factor in the United States, causing one out of every thirty-five deaths).

[35]. The Founders went to great lengths to ensure that the very nature of representative democracy clearly articulate that this system is meant for electeds to take care of everyone, equality and justice for all, subject to their representation. Over the course of United States history, however, and in terms fulfilling such representation, there were many shortcomings to this theory throughout United States history--for example, women could not vote until 1920; Black men until post-Civil War.

and the vulnerable young are left powerless to shape the circumstances of their current and future interests.[36]

Despite the potential successes of social movements, such as the the *Fridays for Future* campaign, seeking social pressure as a means to disrupt the structural oppression and societal inequalities they face, one glaring question still remains: namely, whether the federal government is accountable for its knowing disproportionate imposition of harms and burdens facing the interests of rising and future generations.[37] It seems safe to first assume that future people will exist and be bearers of rights that are determined by the interests that are meant to protect them.[38] The question that readily follows is: whether the federal government's actions are limited in a way that prevents the disproportionate allocations of harms and burdens toward them. These inquiries emphasize the need to reconfigure how the federal government recognizes its relationship and connection to the interests of rising and future generations over time.[39] Thus, while maintaining an eye toward intergenerational climate justice, this chapter combines interdisciplinary scholarship to help establish this ethical recognition.

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[36]. Pippa Norris, *Young People & Political Activism: From the Politics of Loyalties to the Politics of Choice?*, Harvard University John F. Kennedy School of Government (2004), https://sites.hks.harvard.edu/fs/pnorris/Acrobat/COE%20Young%20People%20and%20Political%20Activism.pdf. The sense for *justice* has been been argued as an innate sense of fairness, combined with moral sensibility, which leads to moral outrage that is often expressed through counterstrategies to deter the exploitative actions.

[37]. This question is asked consistent with the normative principles of distributive justice (i.e., demanding protection to their rights to future interests, such as subsistence, health, and safety interests) Matthew Diemer et. al., *Development and Validation of the Critical Consciousness Scale*, Youth & Society 2017, Vol. 49(4) 461– 483; *See also* Marion Hourdequin, *Youth climate movement puts ethics at the center of the global debate*, (2019) https://theconversation.com/youth-climate-movement-puts-ethics-at-the-center-of-the-global-debate-123746; *See* Anthony Walsh and Craig Hemmens, *Law, Justice, and Society: A Sociolegal Introduction*, 4th Ed., Oxford University Press (2016).

[38]. *See* Caney, 2010, "Climate Change, Human Rights and Moral Thresholds", in *Human Rights and Climate Change*, Stephen Humphreys (ed.), Cambridge: Cambridge University Press, 69–90. doi:10.1017/CBO9780511770722.004; *See also* Herstein, Ori J., 2008, *Historic Justice and the Non-Identity Problem: The Limitations of the Subsequent-Wrong Solution and towards a New Solution*, *Law and Philosophy*, 27: 1180–82 (This argument is possible only if attributing rights to people does not require the present to make reference to individual persons. The idea here is that such obligations do not depend on the particular identity of future persons).

[39]. These inquires of intergenerational climate justice require a reframing of ethical recognitions, regardless of whether they concern questions of rights, responsibilities, distribution, or procedures. For more on this argument, *see* Page, Edward, 2006, *Climate Change, Justice and Future Generations,* Cheltenham, UK: Edward Elgar, 71–75.

This chapter is important for the sociolegal purposes of this dissertation because the federal government's political and legal actions most often reflect the outcome of a process of deliberation that is informed by well-established ethical recognitions.[40] So, clearly articulating this will help frame the political and legal decision-space—wherein further deliberation and actions may be acceptably pursued. However, as the prominent environmental justice scholar and Director of the Global Environmental Justice Project David Pellow aptly articulated, simply stating a series of vague ethical principles without providing sufficient context "is insufficient in accounting for the various institutional conditions underlying the poor distribution" of harms and burdens.[41] In other words, critical context is necessary before an ethical recognition may be fully understood, developed, and normalized.

Accordingly, following this introduction, Section II provides a brief synthesis of the critical historical, sociological, and philosophical context leading up to the long environmental justice history in the United States. Section III continues the chronological discussion by recounting environmental justice history from its origin to its interconnection with the current day climate justice frontiers. This discussion is accomplished by maintaining a special focus on the experiences of children and youth, and by analyzing how and why their future interests are not adequately represented by the federal government of this present generation in this context.

Section IV combines this interdisciplinary research with a reframed ethical recognition for intergenerational climate justice, which helps make explicit the ethical boundaries marking the aforementioned political and legal decision-space. This chapter concludes that this ethical recognition, which is premised on responsibilities based on a precautionary principle, not only compels the federal government to actively engage in mitigatory actions—by, for example, taking the steps toward making rapid, large-scale, systemic changes to social institutions sufficient to curb the disproportionate distributions

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[40]. Law, Justice, and Society: A Sociolegal Introduction.

[41]. David Pellow, *What is Critical Environmental Justice?*, Naguib. 2017. New York: Polity Press. Pellow is Dehlsen Chair and Professor of Environmental Studies and Director of the Global Environmental Justice Project at the University of California, Santa Barbara

of harms and burdens—but also requires the federal government to take active measures in increasing the adaptive capacity particularly for those most disadvantaged among the rising and future generations.

II. Critical Context: The Enduring Impact of Settler Colonialism, Problems of Unchecked Capitalism, and Competing Philosophies of Social Justice

A. Exploitative Roots of Settler Colonialism

There is rooted in the United States a systematic precondition of prejudice that deeply permeates society and is arranged within its social institutions, including the institution of law.[42] Colonial expansion, which was modeled after the English colonization and removal of the Irish, spread into the Americas by following a process based on supremacy ideologies (a concept that expands far beyond that of white supremacy), which left a trail of violent dominations throughout the extent of United States history.[43] The same settler colonialism structure that enabled institutions to operate exploitive systems and violent displacement tactics is also the foundation for Western cultural values.[44] These values are described by sociologists as being normalized in a system of oppression, with an ingrained hierarchal thinking pattern, centered in a worldview that is unconsciously organized in oppressive, binary terms—effectively othering members of society who are associated by a discrete appearance or status.[45]

Even early conservationism and environmentalism in the United States were based on the colonial strategies of land expansion and protection, which were justified

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[42]. Dina Gilio-Whitaker, *As Long as Grass Grows: The Indigenous Fight for Environmental Justice, from Colonization to Standing Rock,* New York: Beacon Press (2019) (*stating*, for example, that Federal Indian Law was established on the basis of the doctrine of discovery, which very notion that discoverers of land are entitled to that land enabled legal, large-scale displacement of Natives).

[43]. Patrick Wolfe, *Settler colonialism and the elimination of the native*, Journal of Genocide Research (2006), 8(4), December, 387–409 http://www.kooriweb.org/foley/resources/pdfs/89.pdf.

[44]. *See* David Pellow, *What is Critical Environmental Justice?*, Naguib. 2017. New York: Polity Press; *see also* Greta Gaard, *Toward a Queer Ecofeminism*, Hypatia. Vol. 12. Issue: 1. (1997), 23.

[45]. *id*.

mainly at the expense of land alienation from Indigenous people.[46] Indigenous scholars explain that the settler colonialism structure of using superiority to justify domination caused "Indigenous communities and poor people [to be] removed, relocated, and displaced to protect privileged leisure access to 'nature,' or white settler economic interests."[47] Because indigenous communities center their relationships with the landscape, such displacement effectuated cultural genocide.[48]

With respect to African Americans, from the transatlantic slave trade to indentured servitude; Dred Scott; State sanctioned lynchings; Jim Crow segregation; The civil rights movement—including the vast field of movements which encompasses the entire black freedom movement; and to the present day, post-Gorge Floyd, #blacklivesmatter movement, black Americans have experienced, and continue to experience, the brunt of this deeply racialized history of superiority and dominance.[49] An honest account of the history of the United States would accurately reflect that it only became a global financial powerhouse in its early years because of its exploitative patterns of settler colonialism and dominance. That is, it should be clearly recognized that the economic value generated by the displacement of indigenous lands coupled with the transatlantic slave trade and extensive use of slave labor was the primary foundation for

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[46]. Richard H. Grove, *Green Imperialism, Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600–1860*, Cambridge University Press (1996), available at https://www.cambridge.org/ca/academic/subjects/history/regional-history-after-1500/green-imperialism-colonial-expansion-tropical-island-edens-and-origins-environmentalism-16001860?format=PB&isbn=9780521565134; *see also* Mark Dowie, *Conservation Refugees: The Hundred-Year Conflict between Global Conservation and Native People*, MIT Press.

[47]. Gilio-Whitaker explained that scholars identify that the "relationship between industrialism, resource extraction, and infrastructure development exposes the collusion between corporate interests and government that has been a core process of the US settler State." Which is why an estimated eighteen million Indigenous people on the continent north of Meso-America in 1492 the population count of roughly 228,000 in the 1890 census—decline of population by approximately 99 percent, *see id* at 49.

[48]. Nick Estes, *Our History Is the Future: Standing Rock Versus the Dakota Access Pipeline, and the Long Tradition of Indigenous Resistance,* Penguin Random House (2019); *see also* Soren Larsen & Jay Johnson, *Being Together in Place Indigenous Coexistence in a More Than Human World*, University of Minnesota Press (2017). *See* infra Chapter 3 of this dissertation.

[49]. Joe Curnow & Anjali Helferty, *Contradictions of Solidarity, Whiteness, Settler Coloniality, and the Mainstream Environmental Movement in Environment and Society*, Berghahn Books (2018).

economic prosperity in the United States.[50] From the initial dispossession and enslavement, the systemic pattern of both slavery and the expropriation of land that continued through the decades helped launch capitalism each in their own way.[51]

There is much more to this history, but the depth in this area is beyond the scope of the dissertation.[52] As much of this is about race and class, the focus here is on tying this critical context to the oppression of rising and future generations—in addressing the core question of why society oppresses its own offspring.

B. Unchecked Capitalism, Negative Externalities, and the Need for Governmental Controls

The United States emerged from WWII as the wealthiest superpower in the world.[53] Economic ties grew increasingly more international, and the economic ideal of free enterprise amplified drastically.[54] This free market ideology fostered an incentive structure dissuading profit-oriented corporations from considering anything other than their own short-term, self-interests.[55] Corporations increasingly crossed local and state boundaries and operated in competition and largely free of state control.[56] Speculative

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[50]. *See Gilio-Whitaker* (*explaining* that scholars estimate that this resulted in close to $50 trillion of economic gain in the United States. Before the Civil War, cotton became the world's largest commodity. The cheapest and best cotton came from the southern United States)

[51]. For research, to the Civil War and the Reconstruction era, searching to produce a true democracy through inclusiveness of black Americans, *see* William A. Darity Jr., A. Kirsten Mullen, *From Here to Equality, Reparations for Black Americans in the Twenty-First Century* (*detailing* largely with the economic divide and racial gulf in wealth accumulation and intergenerational effects on black economic well-being, between black and white Americans).

[52]. This also includes disproportionate impacts imposed on Asian Americans and Latino Americans. This is to emphasize that the grievous injustices and gross inequalities lingers this present day and will likely extend deep into the future.

[53]. David Frum, *The Real Story of How America Became an Economic Superpower*, (December 24, 2014) https://www.theatlantic.com/international/archive/2014/12/the-real-story-of-how-america-became-an-economic-superpower/384034/.

[54]. *id*.

[55]. *id*.

[56]. Business models ingrained the logic of maximizing profits and remaining beholden to the bottom line. *see id*.

capitalism[57] caused a series of economic booms and busts, and such exploitative behavior became a primary source of sacrificing future humanity's wellbeing for the benefit of endless economic growth for the present.[58] Incidentally, this economic system proved over time to enrich and empower the top echelon of society, all while intensifying the political system of minority rule.[59]

This pattern of perpetual growth for the benefit of the present defined capitalism at the time,[60] and the byproduct of negative externalities (i.e., when the product or consumption of a good or service exerts a negative effect on a third party outside of the market), grows at a somewhat equivalent rate.[61] Although presumably unintentional, these market failures[62] of increased negative externalities, which soared drastically post-WWII, proliferated detrimental health impacts—specifically among vulnerable communities and especially the young.[63] In particular, the rapid production of chemical polymers used for the advancement of industrial technologies led to the mass release of toxic substances into common pool resources.[64] This unchecked development in the

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[57]. Speculative assets are defined as having little or no identifiable financial substance, the returns from which are expected to come from its sale at a higher price to somebody else. The logical conclusion based on this definition is that speculation is never good, at least in the sense that it never contributes to the productive economy. *see* https://theconversation.com/financial-speculation-the-good-the-bad-and-the-parasitic-33613. (explaining that when speculation is bad is when the ever-increasing sums of money are invested in derivative products promising substantial returns that are not supported by the actual underlying earnings).

[58]. Joseph E. Stiglitz, *People, Power, and Profits: Progressive Capitalism for an Age of Discontent* (Norton, New York, 2019), p. 371.

[59]. *Id*.

[60]. Although the quest for growth is an artifact of defining economic health in terms of growth in GDP, if instead society used an index of well being, there could be still still have capitalism without constantly trying to grow (i.e., exploit resources).

[61]. An ordinary transaction involves two parties, i.e., consumer and the producer, who are referred to as the first and second parties in the transaction. Any other party that is not related to the transaction is referred to as a third party. https://corporatefinanceinstitute.com/resources/knowledge/economics/negative-externalities/

[62]. Investopedia, *Market Failures*, https://www.investopedia.com/terms/m/marketfailure.asp (April 6, 2020) (*Explaining* that "Market failure is the economic situation defined by an inefficient distribution of goods and services in the free market. In market failure, the individual incentives for rational behavior do not lead to rational outcomes for the group.").

[63]. D. S. Davies & Judith R. Stammers, *The Effect of World War II on Industrial Science*, Proceedings of the Royal Society of London. Series A, Mathematical and Physical Sciences Vol. 342, No. 1631 (1975) available at https://www.jstor.org/stable/78750?seq=1#metadata_info_tab_contents.

[64]. *Id*.

1950s led to an array of negative externalities, which became increasingly more apparent across the countryside and on young peoples' health.[65]

Because young people are uniquely susceptible to harms caused by prolonged exposure to toxics, the child labor movement had for years prior to the 1950s pressed the federal government to assert special protection for children from hazardous working conditions.[66] Although exposure to toxics is far from the only factor that prompted child labor reform—in many ways, the child labor movement was successful in prompting the federal government to secure special protection for the young, resulting, for example, in the Hazardous Occupations Orders under the Fair Labor Standards Act (i.e., it designated the work generally unsuitable for young people below a certain age).[67]

But it was the negative externalities specifically caused by atomic fallout, and its discrete impacts on children and future generations, that gained extraordinary public attention with regards to concerns over environmental health hazards.[68] The famous author E.B. White, known primarily for his influential children books, recognized in 1956 that these discrete impacts posed a different sort of future harm that came at the "price of genetic disintegration."[69] The rising nuclear fallout movement solidified the need for the federal government to look to the future and take collective action in reducing the negative externalities that were causing these long-term health impacts. This driving need

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[65]. *Id*. The 1950s is a moment in time within the Anthropocene referred to as the Great Acceleration see Will Steffen, et. al., T*he trajectory of the Anthropocene: The Great Acceleration*, (Jan, 16, 2015) https://journals.sagepub.com/doi/abs/10.1177/2053019614564785?journalCode=anra thetrajectory

[66]. Children could often not work because of the health vulnerabilities from on site exposure to toxics. *see Child Labor Under the Fair Labor Standards Act. Hazardous Occupations Orders* Issued by the Secretary of Labor: *Work Generally Unsuitable for Certain Young Persons*, *see* https://www.everycrsreport.com/files/20131118_RL31501_008741c7351fd72ae2a262198ba9c0e44921a60a.pdf; *See also* Congressional Research Service, *Child Labor in America: History, Policy, and Legislative Issues,* Analyst in Labor Policy, November 18, 2013.

[67]. *Id*. Michael Schuman, *History of child labor in the United States—part 2: the reform movement*, Monthly Labor Review, Jan. 2017, Office of Administration, U.S. Bureau of Labor Statistics, https://www.bls.gov/opub/mlr/2017/article/history-of-child-labor-in-the-united-states-part-2-the-reform-movement.htm.

[68]. *See* Women's Strike for Peace, which was an organization that evolved out of an international protest against atmospheric nuclear testing, held on November 1, 1961.

[69]. *See* E.B White, *Sootfall and Fallout*, 1956.

directly prompted the public to perceive a new range of environmental health concerns, which not only led to a test ban treaty but also paved the way for the emerging environmental movement.[70]

Because of its complex origins and interconnections, environmental historians are increasingly describing the environmental movement as more of a "field of movements."[71] Yet, Rachel Carlson's 1962 publication of *Silent Spring* is often associated with sparking a beginning of the environmental movement, which scholars suggest awakened the United States to the dangers and interconnection of mass chemical dispersions and health hazards, that were found as especially pronounced on the vulnerable young.[72] Amplified by national news media (consider the impact of TV at that time), negative externalities on human health and long-term environmental consequences became especially evident to the public in the late 1960s. A series of disastrous events occurred throughout the nation, including: the Santa Barbara oil spill, the Cuyahoga River catching fire (for the twelfth time), and dense, visible smog in cities ranging from Los Angeles to New York City.[73] Over the course of the 1970s, and in direct response to

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[70]. *See* Char Miller and Jeff Crane, *From Bomb to Bone: Children and the Politics of the Nuclear Test Ban Treaty*, University of Colorado Press, 2019.

[71]. Ellen Spears, *Rethinking the American Environmental Movement Post-1945*, Routledge, 2019 (*describing* the environmental movement as a "field of movements", which roots the movements in broader social justice activism among diverse populations concerning various issues: legislative developments, scientific developments, nuclear threats, pollution, and urban living. Spears explains how traditional narratives have left out many constituencies, including: women, workers, indigenous populations, people of color, and immigrants); *See also* Robert Gottlieb, *Forcing the Spring: The Transformation of the American Environmental Movement*. Rev. and updated ed. Washington, DC: Island Press, 2005. First published 1993. (*expressing* how the roots of environmentalism were so diverse in that there were "mini movements" which can be described as both a social movement and a collection of values with divergent strategies defining cause and solution that extend along a spectrum from radical to reform).

[72]. Larry West, *The Origins of the Environmental Movement*, https://www.thoughtco.com/origins-of-the-environmental-movement-1203559 (last updated March 10, 2019). (*Describing* how this field of movements coincided with the passage of civil rights legislation in the 1960s)

[73]. NPR, *50 Years Later: Burning Cuyahoga River Called Poster Child For Clean Water Act*, (June 18, 2019) https://www.npr.org/2019/06/18/733615959/50-years-later-burning-cuyahoga-river-called-poster-child-for-clean-water-act; *see also* Science History Institute, *The Myth of the Cuyahoga River Fire: The blaze that sparked the modern environmental movement . . . or did it?*, https://www.sciencehistory.org/distillations/podcast/the-myth-of-the-cuyahoga-river-fire (last visited Dec. 10, 2019).

the increased public abhorrence to these visible landscape changes, Congress enacted almost every major federal environmental law that is still in effect today.[74]

These environmental laws highlight the fact that the principle that a free market of self-interested buyers and sellers maximizes benefit to society depends on assumptions that often do not exist in the real, biological, world.[75] These positive laws work, in part, by placing costs on negative externalities, which, in turn, help curb the incentives for corporations to engage in rapid, exploitative growth.[76] For example, the costs placed on products force corporations to internalize social cost by balancing its production with, among other things, social health considerations. By the end of the 1970s, approximately 55,000 chemicals had entered into the metaphorical stream of commerce.[77] From the young students exposed to toxic waste near Love Canal, New York, to toxic groundwater that caused clusters of Leukemia upon children in Woburn, Massachusetts, the prominent and growing anti-toxic movement and accompanying research "sought to understand, and then restructure, the system of toxic waste production in the United States."[78] This was later described as the start of public engagement in "pollution prevention that took direct action at the structural understanding of power and discrete assaults."[79] As these negative effects of market failures were felt most acutely by marginalized populations, some of the

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74. Pursuant to the Commerce Clause of the Constitution, Congress enacted the National Environmental Policy Act (NEPA), the Clean Water Act (CWA), the Clean Air Act (CAA), including the creation of the Environmental Protection Agency (EPA), all in the year 1970; The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) was enacted in 1972; The Safe Drinking Water Act (SDWA) was enacted in 1974; The Toxic Substances Control Act (TSCA) was enacted in 1975; The Resource Conservation and Recovery Act (RCRA), in 1976; and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), in 1980.

75. Cooperative efforts to ameliorate these concerns coincided and environmental law began with the creation of the Environmental Protection Agency. The laws emerged as a result of grassroots social movements, which included the launching of the first Earth Day and the passage of NEPA.

76. Luke Cole and Shila Foster, *From the Ground Up: A History of the Environmental Justice Movement*, NYU Press, 2001.

77. *Id*.

78. *Id*.

79. *Id*.

most prominent political philosophers began to engage in a range of ethical questions of social justice.[80]

C. Competing Philosophies of Social Justice

Building upon the social contract traditions of John Locke, Jean-Jacques Rousseau, and Immanuel Kant, the American political philosopher John Rawls, in his 1971 work *A Theory of Justice*, conceptualized the ideal principles of social justice as the objects of a cooperative venture between free and equal members of society for their mutual advantage.[81] He envisioned a just society as one that arranges its social institutions so that its least advantaged members are provided with the fair allocation of harms and benefits. Rawls argued that a rational, self-interested individual, when shrouded in a theoretical veil of ignorance—that is, without any foreknowledge of their own status in society—is most inclined to choose a system of social justice that protects the most vulnerable members of society because they, or their descendants, just may end up in that disadvantaged position.[82]

Rawls was also the first political philosopher to devise a systematic account of ethical obligations to rising and future generations.[83] He contemplated that the veil of ignorance will prevent those within the original position from knowing to which particular generation they will belong.[84] Because this sense of justice will inevitably lead to a reasonable agreement to a social contract of a well-ordered society, Rawls posited

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[80]. Noah Diffenbaugh & Marshall Burke, *Global warming has increased global economic inequality*, PNAS May 14, 2019 116 (20) 9808-9813, available at https://www.pnas.org/content/116/20/9808 (*explaining* that statistics about what percent of children/youth live in poverty—and how that compares to what adult populations suffer).

[81]. Rawls, John, 1971, *A Theory of Justice*, Oxford: Oxford University Press; second revised edition, Cambridge, MA

[82]. *See id.*

[83]. *See id.*

[84]. *See* John Rawls, 1993, *Political Liberalism*, New York: Columbia University Press, 274; *see also* John Rawls, 2001, *Justice as Fairness*, Cambridge, MA: Harvard University Press, paragraph 25.2.

that obligations to future people is a central element of any theory of social justice.[85] He added that there is a "motivational assumption" to which the individuals care for their descendants so that they will want to agree to protect and save for their successors.[86] "Thus the correct [ethical] principle[,]" as Rawls described it, "is that which the members of any generation (and so all generations) would adopt as the one their generation is to follow and as the principle they would want preceding generations to have followed (and later generations to follow), no matter how far back (or forward) in time."[87]

However, as Rawls aptly observed, well-ordered societies are rare in reality due to the fact that "what is just and unjust is usually in dispute."[88] Rational, self-interested individuals are not denied the information about themselves, nor are they aloof from the particular positions in which they hold within society.[89] So, conflicts of interests emerge between the individual and society, not to mention the present and the future.

Expounding upon this notion and arguing in direct opposition to Rawls' theory of social justice, Nobel-winning economist Friedrich Hayek argued in 1976 that any attempt to interfere with the outcomes in a naturally competitive social system poses a direct threat to individual freedoms. He explained that "[t]he manner in which the benefits and burdens are apportioned by the market mechanism would in many instances have to be regarded as very unjust if it were the result of deliberate allocation to particular people."[90] In other words, in Hayek's view, it would be unjust for the federal government to regulate

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85. Rawls, John, 1971, *A Theory of Justice*, Oxford: Oxford University Press; second revised edition, Cambridge, MA: Harvard University Press, 1999, section 44; *see also* John Rawls, 1993, *Political Liberalism*, New York: Columbia University Press, 274; *see also* John Rawls, 1999, *The Law of Peoples*, Cambridge, MA: Harvard University Press; John Rawls, 2001, *Justice as Fairness*, Cambridge, MA: Harvard University Press, sections 49.2 and 3.

86. Rawls, John, 1971, *A Theory of Justice*, 144–45. This motivational assumption is applicable regardless of whether previous generations had protected conditions for them. He argues that the contractors would agree to a "savings principle" subject to the "further condition that they must want all previous generations to have followed it."

87. John Rawls, 1993, *Political Liberalism,* 274; *see also* John Rawls, 2001, *Justice as Fairness*, 160.

88. John Rawls, *A Theory of Justice*, Cambridge, MA: Harvard University Press. Revised edition, 1999.

89. This philosophical debate with regard to justice as fairness, has been in circulation and debated in democratic societies since Aristotle.

90. Friedrich Hayek, 1976.

sufficient to curb market impacts of negative externalities, regardless of whether the disproportionate harms and burdens are felt by those most vulnerable among society (and regardless of whether they belong to this generation or to future generations), simply because the competitive market mechanism says so.

Hayek's rejection of the possibility of social justice by means other than that of the whimsical outcome of a capitalist, laissez-faire, market system became and remains the central tenets of the neoliberal ideology.[91] The early environmental justice movement that started to take form by the close of the 1970s, including the concurrent scholarship about the movement, began to expose the many flaws and pitfalls inherent in Hayek's narrow vision of social justice.[92] A political philosophy that places an unchecked market system as the sole indicator of social justice widely fails to respect the reality, in which Rawls successfully contemplated, that—within the United States—individuals are part-and-parcel of an ordered society protected by a government by and for the people with shared interests and rights that transcend the exploitative outcomes of an unfettered market system.

III. From Environmental Justice Beginnings to Climate Justice Frontiers

A. A History of the Environmental Justice Movement

The environmental justice movement began with young, poor, black activists who protested government action within their own communities.[93] In 1978, a small group of

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[91]. Hoerber T. (2019) *The Roots of Neoliberalism in Friedrich von Hayek*. In: Hoerber T., Anquetil A. (eds) Economic Theory and Globalization. Palgrave Macmillan, Cham.

[92]. The civil rights movement of the 1950s and 60s, and the anti-toxic moment of the 1970s "both spark[ed] and shap[ed] the environmental justice movement." *see* Cole and Foster, The term "environmental racism" was coined by Benjamin Chavis in 1982—as he offered a succinct label for the injustice. "Environmental Racism is racial discrimination in environmental policy making, the enforcement of regulations and laws." This was law allowing a market system to impose negative externalities, in the form of environmental hazards, disproportionately upon low-income residents and communities of color.

[93]. Dorceta Taylor, *The Rise of the Environmental Justice Paradigm: Injustice Framing and the Social Construction of Environmental Discourses*, Sage Journals (2000) https://journals.sagepub.com/doi/10.1177/0002764200043004003. Other communities of color had organized to oppose environmental threats before this time: In the early 1960s, Latino farm workers organized by Cesar Chavez fought for workplace rights and protection from harmful pesticides; In 1967, African-American students opposing a city garbage dump in their Houston community; In 1968, residents of West Harlem, in New York City, fought unsuccessfully against the siting of a sewage treatment plant in their community.

activists gathered to protest the continuation of the Whispering Pines garbage dump located within their community in Houston, Texas—which was comprised of over eighty-two percent black residents.[94] The lawsuit that ensued shortly thereafter became the first case in the United States to uphold charges of environmental discrimination in waste facility sitings.[95] The young sociologist Robert Bullard, later known as the "father of environmental justice", provided the expert testimony on behalf of the plaintiffs—and successfully exposed to the court that the city of Houston was engaging in a systematic pattern of disproportionately designating garbage dumps in the closest proximity to people of color and low-income communities.[96] His quantitative study was later consolidated in a report titled *Solid Waste Sites and the Black Houston Community*, which environmental justice scholars credited as not only inspiring a "call for policy changes at the local, state, and national levels [but also] foundational for shaping environmental justice scholarship."[97]

Early environmental justice scholarship, such as Bullard's initial work, played such a profound role in elevating the environmental justice movement that some scholars suggest was potentially more impactful here that with "any other broad-based social movement in the United States."[98] Such scholarship was so impactful initially because it challenged the way in which the environment was traditionally viewed. Instead of describing the environment as somewhere outside and beyond, somewhere that someone can get away from, or into, environmental justice scholars articulated the environment as something that is here, with us, and forever in us.[99] In turn, this idea shaped not only the

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94. Luke Cole and Shila Foster, *From the Ground Up: A History of the Environmental Justice Movement*, NYU Press, 2001.

95. *See Bean v. Southwestern Waste Management Corp.*, 482 F. Supp. 673 (S.D. Tex. 1979). The Houston lawyer Linda Bullard brought this civil rights lawsuit. Robert Bullard was hired by his wife, Linda Bullard, who was the plaintiffs' attorney in this case.

96. *Id*.

97. *See* Robert Bullard, *Solid Waste Sites and the Black Houston* Community, Sociological Inquiry Vol. 53, (Spring 1983): 273-288; *see* Luke Cole and Shila Foster, *From the Ground Up: A History of the Environmental Justice Movement*, NYU Press, 2001.

98. Luke Cole and Shila Foster, *From the Ground Up: A History of the Environmental Justice Movement*, NYU Press, 2001.

99. *Id*.

dynamics of the environmental justice movement but also national consciousness with respect to the relationship among environmental harms and human health.[100]

The conception of environmental justice is centered in the idea that the environment is inextricably linked with human health and must always be integrated with social justice from the State.[101] It was in 1982, that the environmental justice movement gained national attention. That was the year that North Carolinian officials decided to permit 6,000 dump-truck loads of dirt laced with a complex mixture of toxic chemicals, identified by the acronym PCB (*Polychlorinated Biphenyls*), to be dumped at a hazardous waste landfill located in Warren County—the poorest and most predominantly black county in all of North Carolina.[102] The state officials and the local residents alike were well aware of the widely circulated fact that young people were most susceptible to the neurobehavioral and immunological changes caused by prolonged exposure to PCBs.[103] Nevertheless, that fact did not deter the state officials' decision, and, before the caravan of yellow dump-trucks could reach their destination point, they were stopped short by youth activists who laid across the access road leading to the permitted site.[104] The Washington Post described the ensuing protests in real time:

> They have marched daily to the dump in double-file, lying in front of, locking arms and refusing to move until state troopers lug them out of the way. […] By last Friday, 485 arrests had been made, according to the Warren County sheriff's office.[105]

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[100]. *Id*.

[101]. Robert Bullard, *Race and Environmental Justice in the United States*, Yale Journal of International Law, Vol. 18, Art. 12, 1993.

[102]. Dept. of Heath and Human Services, Agency for Toxic Substances and Disease Registry: Division of Toxicology and Human Health Sciences, *Polychlorinated Biphenyls—ToxFAQs*, https://www.atsdr.cdc.gov/toxfaqs/tfacts17.pdf (last visited Dec. 10, 2019). PCBs had been regulated out of the stream of commerce pursuant to TSCA for nearly six years.

[103]. *Id*.

[104]. Dale Russakoff, *As in the '60s, Protesters Rally*, (October 11, 1982) https://www.washingtonpost.com/archive/politics/1982/10/11/as-in-the-60s-protesters-rally/47e2d0e3-8556-4d9f-8a77-8a78ab51ca61/; PCB's were directly regulated and removed from the market in the 1976 under TSCA.

[105]. *Id*.

Televised live coverage and photographs in newspapers of the children and youth strain across the pavement halting the dumping shone a national spotlight on the Warren County protests, which galvanized national attention.[106] (*See* Figure 1.2)

Figure 1.2 Youth in Warren County halting state dump trucks filled with loads of dirt containing PCBs from being dumped in their neighborhood. Scholars explain that this was "the first major action joining civil rights and white campaigners since the 1960s"[107]

The Warren County protests were successful in prompting the federal government, via the United States General Accounting Office (GAO), to conduct an extensive study on four of the most hazardous waste sites in the Southern United States.[108] In 1983, the results of the study confirmed that the communities in closest proximity to the sites were disproportionately represented by predominantly black

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[106]. Davis Scholsberg and Lisette Collins, *From Environmental to Climate Justice: Climate Change and the Discourse of Environmental Justice*, at 360; *see also PCB Protest in Warren County 1982*, https://www.youtube.com/watch?v=1iCxh0BYjgI (last visited Dec. 2019).

[107]. *Id*.

[108]. U.S. General Accounting Office, *Siting of hazardous waste landfills and their correlations with racial and economic status of surrounding communities,* Washington, DC: U.S. (1983), available at https://www.gao.gov/assets/200/190467.pdf.

populations.[109] These findings prompted the Commission for Racial Justice of the United Church of Christ (UCC) to sponsor a study of the racial composition of the communities surrounding hazardous waste sites located throughout the United States. This national study culminated in the 1987 report, *Toxic Wastes and Race in the United States*.[110] This report found that race was the single most likely indicator for determining which communities were located in closest proximity to commercial hazardous waste facilities in the United States.[111]

Bullard's 1990 work, *Dumping in Dixie: Race, Class, and Environmental Quality*, was the first scholarship to describe the interconnection among social justice and the ongoing environmental movements.[112] *Dumping in Dixie* detailed that there is a systematizing form of racial and class segregation throughout the United States, in which public officials deliberately target marginalized communities to exposure to hazards.[113] Bullard defined environmental justice as the "principle that all people and communities are entitled to equal protection of environmental and public health laws and regulations."[114] This is when Bullard explained that the conception of environmental justice is centered in the idea that the environment is inextricably linked with human health and must always be integrated with social justice from the state.[115]

The first National Academic Conference of environmental justice scholars gathered at the University of Michigan shortly after the publication of Bullard's *Dumping*

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[109]. *Id*.

[110]. UCC Commission for Racial Justice, *Toxic Wastes and Race in the United States: A National Report on the Racial and Socio-economic Characteristics of Communities with Hazardous Waste Sites*, University of Michigan, 1987.; https://www.nrc.gov/docs/ML1310/ML13109A339.pdf; Polychlorinated Biphenyls (PCB) is a chemical that is demonstrated to cause a variety of adverse health effects: shown to cause cancer, immune system, reproductive system, nervous system, endocrine system and other health effects. More information here: https://www.epa.gov/pcbs/learn-about-polychlorinated-biphenyls-pcbs.

[111]. *Id*.

[112]. Robert Bullard, *Dumping in Dixie: Race, Class, and Environmental Quality*, Westview Press (1990).

[113]. *Id*.

[114]. *Id*.

[115]. Robert Bullard, *Race and Environmental Justice in the United States*, Yale Journal of International Law, Vol. 18, Art. 12, 1993.

in Dixie.[116] The group of scholars gathered with the purpose of combining research and synthesizing it into various demand letters to be distributed to various state and federal agencies, including the EPA. Within a few months of receipt of those letters, the head of the EPA established the Environmental Equity Working Group, which conducted further research and confirmed what was already well known—that "racial minority and low-income populations bear a higher environmental risk burden than the general population."[117] This report was significant in that it prompted the gathering of the first People of Color Environmental Leadership Summit in Washington, D.C., which culminated in the seventeen *Principles of Environmental Justice*, by 1991.[118] This work was the first to explicitly incorporate the interest of young people and future generations as central to the demands of the environmental justice movement.[119]

In 1992, the EPA published a report titled *Environmental equity: Reducing risk for all communities*, which indicated that "racial minority and low-income populations are disproportionately exposed to lead[120], select air pollutants, hazardous waste facilities, contaminated fish tissue and agricultural pesticide."[121] Subsequently, the EPA formed the Office of Environmental Equity in 1993, but, according to the environmental justice scholars at the time, the EPA failed to differentiate the concept of equity from that of

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[116]. Bunyan Bryant and Paul Mohai, *Race and the Incidence of Environmental Hazards: A Time for Discourse*, Boulder, CO:Westview Press, 251*; Paul Mohai, Environmental Justice and the Flint Water Crisis, Michigan Sociological Review, Vol. 32 (Fall 2018), pp. 1-41.*

[117]. *See* EPA, *Environmental Justice: Federal Interagency Working Group on Environmental Justice (EJ IWG)*, https://www.epa.gov/environmentaljustice/federal-interagency-working-group-environmental-justice-ej-iwg (last visited Dec. 10, 2019) (The Environmental Equity Working Group, The Working Group also acknowledged that the EPA is had systematically failed to adequately protect low income communities and communities of color. The Interagency Working Group on Environmental Justice (EJ IWG) facilitates the active involvement of all Federal agencies to implement Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." The order states that "Federal agencies must identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations.").

[118]. EWG, *17 Principles of Environmental Justice*, https://www.ewg.org/enviroblog/2007/10/17-principles-environmental-justice.

[119]. *Id*.

[120]. Lead is one of the key things that brings children directly into the story of this chapter. Concern about kids ingesting leaded paint chips was important. Reiterating that the concerns are about class and race and kids.

[121]. *See Environmental equity: Reducing risk for all communities.*

justice, with respect to how risks should be distributed among society.[122] The scholars explained that "[e]quity demands that environmental risks and burdens be distributed equally among society; environmental justice demands that, as a right, all people are protected from environmental risks […]."[123] This differentiation is key to the understanding of what the environmental justice movement, and the ensuing climate justice movement (including intergenerational climate justice), was demanding—that is, a right to active protection and removal of the hazardous burdens among all members of society, with a heightened focus on those most vulnerable.

By 1994, the growing environmental justice movement prompted the President of the United States to issue *Executive Order (EO) 12898*, which, among other things, created the Interagency Working Group on Environmental Justice.[124] *EO 12898* mandated that, whenever federal funds are distributed, all federal agencies must comply with Title VI of the Civil Rights Act of 1964, in addition to the requirement that federal agencies must place an action forcing procedure within the National Environmental Policy Act (NEPA)—with a special focus on agencies' decision-making process within marginalized communities.[125] By 1998, agency guidance to environmental justice considerations retained the force and effect of law, and consideration of air pollutants on environmental

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[122]. Spencer Banzhaf et. al., *Environmental Justice: The Economics of Race, Place, and Pollution*, Journal of Economic Perspectives—Volume 33, Number 1—Winter 2019—Pages 185–208. see https://www.epa.gov/sites/production/files/2015-02/documents/reducing_risk_com_vol1.pdf. (*explaining* that "There are clear and dramatic disparities among ethnic groups for death rates, life expectancy, and disease rates").

[123]. Susan Cutter, *Race, class and environmental justice*, Progress in Human Geography (1995), *19*(1), 111–122, available at https://journals.sagepub.com/doi/10.1177/030913259501900111#articleCitationDownloadContainer.

[124]. Federal Register, Vol. 59, No. 32, February 16, 1994, Executive Order 12898, https://www.archives.gov/files/federal-register/executive-orders/pdf/12898.pdf

[125]. *Id*. (Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. "This Executive Order requires each federal agency to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority and low income populations. EPA and the Council on Environmental Quality have emphasized the importance of incorporating environmental justice review in the analyses conducted by federal agencies under NEPA and of developing mitigation measures that avoid disproportionate environmental effects on minority and low-income populations"); *see also* DARRP, *Executive Order 12898: Environmental Justice*, https://darrp.noaa.gov/executive-order-12898-environmental-justice (last visit Dec. 10, 2019).

justice communities were fully incorporated.[126] In 1999, the National Academy of Science conducted a national study which concluded that the connection among fence-line communities to coal-fired power plants and the impacts of coal ash imposed disproportionate air quality health impacts particularly on the youngest among those same environmental justice communities.[127] As a result of this public reckoning over the immediate and long-term consequences of greenhouse gas pollution, there emerged a formidable climate justice movement in the United States by the year 2000.

B. Climate Justice Intersectionality, Cross-Generational Concerns, and the Pinnacle Promise of the Paris Agreement (1.5°C threshold)

The first Climate Justice Summit was held at the Hague in 2000, in conjunction with the sixth gathering of the Conference of the Parties (COP6) pursuant to the United Nations Framework Convention on Climate Change (UNFCCC). It was there that the idea of climate justice was brought to the global stage, and the key takeaways were compiled in the founding of the *Environmental Justice and Climate Change Initiative*, which set the mission "to educate and activate the people of North America towards the creation and implementation of just climate policies in both domestic and international

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126. EPA, *Environmental Equity: Reducing Risks for all Communities*, (June 1992), available at https://www.epa.gov/sites/production/files/2015-02/documents/reducing_risk_com_vol1.pdf (*stating* that "[t]he literature relating environmental risk to race and income is limited although highly suggestive. It spans a wide spectrum of environmental problems and population groups exposed.). Just months after countries adopted the first international agreement to cut carbon emissions, in the Kyoto Protocol, climate change became heavily politicized, and a coalition of some of the U.S.'s largest fossil fuel companies actively recruited a Global Climate Science Team to undercut climate science. *See* Inside Climate News, *Global Climate Science Communications Plan (1998)*, https://www.vice.com/en_us/article/wjwawq/the-last-of-the-climate-deniers-hold-on-despite-your-protests-v26n4?fbclid=IwAR1a4fkXA_OrIJRK0Dn4c_xlS0MNXoEznWkD59c57-Q_M3As1kuvDZre0Fs (*including* The American Petroleum Institute's draft Global Climate Science Communications Plan from 1998—including ExxonMobil and Chevron).

127. The first known use of the term 'climate justice' dates to 1999 in the publication of "Greenhouse Gangsters vs. Climate Justice," a report by the Transnational Resource and Action Center. *See* Robert Hill, Environmental justice: Environmental adult education at the confluence of oppressions, Volume (2003), Issue99 Special Issue: Environmental Adult Education: Ecological Learning, Theory, and Practice for Socioenvironmental Change 2003 Pages 27-38; *see also* Schlosberg & Collins, From environmental to climate justice: Climate change and the discourse of environmental justice, Wiley Interdisciplinary Reviews: Climate Change (2014), 5, 359-374. Some scholars argue that the "emergence of climate justice" shaped out of the equity principle in the 1992 United Nations Framework Convention on Climate Change (UNFCCC).

contexts."[128] Largely regarded as one of the most influential moments at the first Climate Justice Summit was when Margie Richard, a multi-generational resident of Louisiana's "cancer alley",[129] presented the representatives of Shell Chemicals with a plastic bag filled with toxic air captured at her home just twenty-five feet away from the fence-line of the company's back-to-back petrochemical refineries.[130] She explained that she was there representing her daughter, who had recently suffered a collapsed lung simply from playing in her own back yard.[131] Richard was later recognized as successfully expressing the growing idea of "double exposures"—in that frontline communities, in particular the vulnerable young (such as her daughter), were exposed to both the harmful direct effects as well as the long-term, cumulative effects caused by fossil fuel emissions.[132]

In 2002, the *Principles of Climate Justice* were declared and added to the *Principles for Environmental Justice*.[133] The *Principles of Climate Justice* recognized that "the impacts of climate change threaten the health of communities [...]—especially those

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128. Frederika Whitehead, *The first climate justice summit: a pie in the face for the global north*, (Apr. 16, 2014) https://www.theguardian.com/global-development-professionals-network/2014/apr/16/climate-change-justice-summit).

129. To this day, the children of the predominantly black and low-income communities of cancer ally suffer some of the worst compromised immune systems and high rates of disease—which was especially prominent during the Covid-19 pandemic. *see* https://www.theadvocate.com/acadiana/news/coronavirus/article_94494420-6d4b-11ea-ac42-ff7dd722c084.html.

130. Goldman Environmental Prize, *Margie Richard: 2004 Goldman Prize Recipient*, available at https://www.goldmanprize.org/recipient/margie-richard/ (last visit Dec. 10, 2019) ("Margie Richard secured agreement from Shell Chemical to reduce its toxic emissions by 30 percent, contribute $5 million to a community development fund, and finance relocation of her Old Diamond neighbors in Louisiana." "Richard, whose campaign has been hailed as a landmark environmental justice victory, holds the distinction as the first African-American to win the Goldman Environmental Prize").

131. *Id*.

132. Goldman Environmental Prize, *Margie Richard: 2004 Goldman Prize Recipient*, available at https://www.goldmanprize.org/recipient/margie-richard/ (last visit Dec. 10, 2019); Joshua Karline, Climate Justice Summit Provides Alternative Vision, (Nov. 21, 2000) https://corpwatch.org/article/climate-justice-summit-provides-alternative-vision; *see also* Schlosberg & Collins, *From environmental to climate justice: Climate change and the discourse of environmental justice*, Wiley Interdisciplinary Reviews: Climate Change (2014), 5, 359-374. For detailed scholarship on the concept of "double exposures": *see* Leichenko, Robin and Karen O'Brien, 2008, *Environmental Change and Globalization: Double Exposures*, New York: Oxford University Press. (*explaining* that "climate justice is especially evident when the extraction of fossil fuels and the industry built around it often directly harm the same interests that are harmed by the emission of greenhouse gases").

133. *See* CorpWatch, *Bali Principles of Climate Justice* (August 28, 2002), https://corpwatch.org/article/bali-principles-climate-justice. Adopted using the Environmental Justice Principles developed at the 1991 People of Color Environmental Justice Leadership Summit, Washington, DC, as a blueprint.

who are vulnerable and marginalized, in particular children."[134] The principles were based on the central assurance of "intergenerational justice."[135] Principle twenty-seven stated that "Climate Justice affirms the rights of [future] generations to natural resources, a stable climate[,] and a healthy planet."[136] The early intergenerational climate justice movement focused mostly on the range of impacts caused by power plant facilities with regards to air pollution hazards.[137] The initial emphasis was on what came out of the stacks and fell on the local fence-line communities.[138] Bullard later explained that it was the devastation of Hurricane Katrina in 2005 that solidified the drive and connection of the environmental justice framework with that of the long-term impacts of climate change.[139] The conception centered on the notion that, for example, those same children in Margie Richard's community in 'cancer alley' who are most acutely experiencing the direct impacts of pollution are also the ones most vulnerable to the rapidly intensifying hurricanes in the Gulf Coast as they grow older.[140]

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[134]. *Id*.

[135]. *See* CorpWatch, *Bali Principles of Climate Justice* (August 28, 2002), https://corpwatch.org/article/bali-principles-climate-justice. Adopted using the Environmental Justice Principles developed at the 1991 People of Color Environmental Justice Leadership Summit, Washington, DC, as a blueprint.

[136]. Schlosberg & Collins, *From environmental to climate justice: Climate change and the discourse of environmental justice*, Wiley Interdisciplinary Reviews: Climate Change (2014), 5, 367 (*stating* that climate justice means "moving to a post-carbon energy system, paying for the ecological and social damage of climate change, and protecting the voice and sovereignty of the most vulnerable"); NAACP Environmental and Climate Justice Program, Environmental and Climate Justice Program Goals, (stating that Environmental injustices, including climate change, have a disproportionate impact on communities of color and low income communities in the United States and around the world), available at http://www.naacp.org/environmental-climate-justice-about/.

[137]. Robert Bullard called them the early stages of "climate intersectionality", with a report in 2005 Associated Press, concerning coal fire power plants *see* https://www.youtube.com/watch?v=kIvMQ-FLsbQ&feature=youtu.be. Robert D. Bullard, "*The Quest for Environmental, Climate, Racial, and Economic Justice in the United States*", Washington State University (2019).

[138]. *Id*.

[139]. Robert Bullard & Beverly Wright, *The Wrong Complexion for Protection: How the Government Response to Disaster Endangers African American Communities*, NYU Press (2012). (explaining that Katrina led to a rethinking of the role of the natural world in a conception of justice).

[140]. Schlosberg & Collins, *From environmental to climate justice: Climate change and the discourse of environmental justice*, Wiley Interdisciplinary Reviews: Climate Change (2014), 5, 362. (reiterating that the impacts of the emissions into the atmosphere are greenhouse gasses that are causing a warming effect which is directly connected with the intensity of hurricane formation and duration in the Gulf coast, and is only worsening for the future).

In 2009, Paul Mohai, David Pellow, and Timmons Robert were the first environmental justice scholars to explicitly incorporate "the emerging issue of global climate justice" as a branch of the larger environmental justice movement.[141] The rapidly growing climate justice scholarship and movement profoundly shaped the discussions surrounding the international climate regime, which led to the 2014 Lima Call for Climate Action and, in turn, directly influenced the language of the 2015 Paris Agreement by explicitly stating in its preamble its unifying theme of "climate justice".[142] Indeed, the notion that the interests and rights of future people should be at the forefront of climate justice was thoroughly discussed and enshrined in the Paris Agreement. Moreover, the central idea that basic rights are to be enjoyed by all people, no matter where or when they will be born, was accepted by almost every nation on Earth. This common touchstone culminated in the concerted effort to limit the increase of global average temperature to 1.5°C above pre-industrial levels—a threshold marked by the scientific consensus (which importance was reaffirmed in the 2018 IPCC *SR15* report and again in the 2021 report) as the level sufficient to maintain a stable climate system and to reduce the impacts of climate harms and burdens facing those most vulnerable among the rising and future generations.[143]

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[141]. *See* Paul Mohai et. al., *Environmental Justice*, Annu. Rev. Environ. Resour. (2009) 34:405–30. The article included injustice between those who are vulnerable to climate disasters by race, ethnicity, class, and gender. The article did not, however, include age, or rising and future generations, as a group most vulnerable the intergenerational component of distributive justice and climate change impacts. Julian Agyeman in 2013 addressed specifically this challenge of and described that climate justice "reflects and increases social inequality in a series of ways, including who suffers most its consequences, who caused the problem, who is expected to act, and who has the resources to do so." *See* Julian Agyeman et. al., *Just sustainabilities: Development in an unequal world*, MIT Press (2013)

[142]. Which directed the Paris Agreement to input in its preamble explicitly notes the importance of "climate justice", https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf; *see also* https://theconversation.com/climate-justice-and-its-role-in-the-paris-agreement-57798

[143]. The 1.5 degrees Celsius goal requires a 45% decrease in global pollution levels by 2030, and to reach not 0 emissions by 2050 (Bontly, 2019); Sanson and Burke, 2020. This is reflected in the Paris Agreement which specified that the target should be [h]olding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels. (Article 2.1(a)).

IV. The Ethical Recognition of Intergenerational Climate Justice

The above critical context, coupled with the long environmental justice history in the United States, exposes the circumstances and various institutional conditions underlying the poor distribution of harms and burdens facing those most vulnerable among the rising and future generations. John Rawls made explicit that any legitimate theory of social justice must be based on obligations designed to protect the interests of rising and future generations.[144] Such obligations, Rawls explained, are meant "to establish and to preserve a just basic structure over time," in accordance with, what he called, a "just savings principle."[145] The initial goal of this principle, Rawls detailed, is to determine a threshold notion of distributive harms relevant for defining the present generation's obligations with respect to future generations.[146] Once this threshold of harm is adequately determined, the present generation is bound to an ethical recognition to take actions sufficient to enable future generations to live under just institutions that protect them from crossing the defined threshold of harm.[147] In turn, the correlative duties owed toward rising and future generations sets a normative framework for further deliberations and actions that will potentially have an impact on their distributive justice.[148]

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144. Rawls, John, 1971, *A Theory of Justice*, Oxford: Oxford University Press; second revised edition, Cambridge, MA: Harvard University Press, 1999, section 44; *see also* John Rawls, 1993, *Political Liberalism*, New York: Columbia University Press, 274; *see also* John Rawls, 1999, *The Law of Peoples*, Cambridge, MA: Harvard University Press; John Rawls, 2001, *Justice as Fairness*, Cambridge, MA: Harvard University Press, sections 49.2 and 3. Attas, Daniel, 2009, "A Transgenerational Difference Principle", in *Intergenerational Justice*, Axel Gosseries and Lukas H. Meyer (eds.), Oxford: Oxford University Press, 189–218.

145 (Rawls 2001, 159; on the basic structure as the subject of the application of a sufficientarian principle]

146. *See* Gardiner, Stephen M., 2009, *A Contract on Future Generations?*, in *Intergenerational Justice*, Axel Gosseries and Lukas H. Meyer (eds.), Oxford: Oxford University Press, 97–116; *See also* Heyd 2009, *A Value or an Obligation? Rawls on Justice to Future Generations*, in *Intergenerational Justice*, Axel Gosseries and Lukas H. Meyer (eds.), Oxford: Oxford University Press, 170–176.

147. Gosseries, Axel, 2001, *What Do We Owe the Next Generation(s)?*, Loyola of Los Angeles Law Review, 35: 293–354. (*providing* a comparative assessment of Rawls's substantive principle); Meyer, Lukas H. and Dominic Roser, 2006, *Distributive Justice and Climate Change. The Allocation of Emission Rights*, *Analyse & Kritik*, 28(2).; *See also* Caney, Simon, 2010, *Climate Change, Human Rights and Moral Thresholds*, in Stephen Humphreys, *Human Rights and Climate Change*, Cambridge: Cambridge University Press, 69–90.

148. *Id*.

Political philosophers have developed Rawls' "just savings principle" over the years, including by some who have developed a specific framework for when dealing with actions that contain inherent uncertainty as to the projected imposition of harms and burdens on rising and future generations.[149] In this context, political philosopher Neil Manson was the first to formulate the basic elements of a "precautionary principle", which, he explained, contains: (1) "a damage condition", (2) a "knowledge condition" and (3) a "remedy".[150] In 2006, Professor Stephen Gardiner at the University of Washington modified these three elements to include: (1) a "threat of harm"; (2) "[u]ncertainty of impact and causality"; and (3) an available "precautionary response".[151] More recently, in 2014, Professor Henry Shue of Oxford and Cornell University, added: (1) the magnitude of potential loss is massive; (2) the likelihood of loss is significant; and (3) the costs of prevention are not excessive when compared against the magnitude of the potential loss.[152]

In sum, the precautionary principle can be described as follows. When these three elements are all present—(1) a damage condition with a potential threat of massive harm; (2) a knowledge condition dealing with a matter of uncertainty where the likelihood of loss is significant; and (3) a remedy is available and the costs of prevention are not excessive as when compared against the magnitude of the potential loss—there is an ethical obligation imposed upon those in power in the present generation to undertake urgent actions to make the projected outcomes facing rising and future generations progressively more unlikely, by keeping the conditions below the defined threshold of harm, until the marginal costs of further efforts become too excessive.[153]

Intergenerational climate justice meets the test for the application of the precautionary principle, and recognition of this precautionary principle imposes an

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[149]. *Id*.

[150]. Manson, Neil A., 2002, *Formulating the Precautionary Principle*:, *Environmental Ethics*, 24(3): 265.

[151]. Gardiner, Stephen M., 2006, *A Core Precautionary Principle, Journal of Political Philosophy*, 14(1): 36.

[152]. Shue, Henry, 2014, *Climate Justice: Vulnerability and Protection*, Oxford: Oxford University Press, 265.

[153]. *Id*.

ethical duty on the federal government of this present generation. In the intergenerational climate justice context, this ethical recognition is applicable to the federal government for the following reasons. The scientific consensus has identified the limit of 1.5°C warming as a sufficient threshold of harm, where crossing such will result in massive harm—which will increasingly worsen disproportionate harms and burdens facing those most vulnerable among rising and future generations.[154] The second prong is met because the federal government can accurately predict, with high levels of scientific certainty, that its continued actions of disproportionate allocation of harms and burdens will significantly undermine the enjoyment of rising and future generations' interests and rights.[155] The third prong is met because a remedy for an alternative mitigation pathway and sustainable development facilitated by climate adaptation law is feasible and currently available and is sufficient to protect rising and future generations from crossing the deemed threshold of harm. This remedy is economically feasible and the costs are not exorbitant as when compared with the magnitude of harm projected toward the interests of rising and future generations.[156]

V. Conclusion

The United States federal government is in a unique position to control the conditions that determine the circumstances that shape the interests of rising and future generations. The critical context of settler colonialism, unchecked capitalism, and the divergent philosophies of social justice—all intwined in the long environmental justice

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[154]. Aside from a sufficientarian threshold of harm, there are other accounts which vary in the degree of responsibility, such as egalitarian, prioritarian or others such as Llavador et al.'s view. These all also have valid considerations. *See* Scheffler, Samuel, 2013, *Death and the Afterlife*, Niko Kolodny (ed.), New York: Oxford University Press.60–63, 72–73,80–81.

[155]. Hoegh-Guldberg, Ove, Daniela Jacob, and Michael Taylor, 2019, *Chapter 3: Impacts of 1.5°C of Global Warming on Natural and Human Systems* in IPCC 2019: 244.

[156]. Rogelj, Joeri, Drew Shindell, and Kejun Jiang, 2019, *Chapter 2: Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development* in IPCC 2019: 93–174 (According to the IPCC a 66% probability of meeting the 1.5°C target results in a greenhouse gas budget of 420 GtCO2 (Rogelj, Shindell, & Jiang 2019: 108). Broome, John, 2012, *Climate Matters: Ethics in a Warming World*, New York and London, W. W. Norton and Company, 120–132. Jamieson, Dale, 2010, *Adaptation, Mitigation, and Justice*, in Gardiner et al. 2010: 263–283. also, 2014, *Reason in a Dark Time: Why the Struggle Against Climate Change Failed—and What it Means for Our Future*, New York: Oxford University Press.

history in the United States—exposes the circumstances and institutional conditions that underlie the poor distribution of harms and burdens facing those most vulnerable among the rising and future generations. The ethical recognition of intergenerational climate justice offers a coherent rationale for determining the parameters that comprise the political and legal decision-space, wherein the federal government is obligated to not only take mitigatory actions to keep warming below the 1.5°C threshold of harm but also to undertake adaptation strategies focused on helping those most vulnerable to cope with the already unavoidable consequences they face.

The following chapter proceeds with a case study concerning the Alaskan Natives of the Northern Bering Sea, who are among those most vulnerable to climate change consequences and are already facing a rapidly diminishing substance and cultural existence because of these consequences. This case study acts as a conceptual bridge, connecting the ethical principles of intergenerational climate justice to the realm of law and policy. It grapples with the problem of ethical and legal responsibilities being ignored or rejected by presidential administrations or political majorities—for example, when executive actions that seemingly comport with its trust obligations are quickly overturned by successive administrations—and critiques the federal government's actions over time in the intergenerational climate justice context.

Chapter 2: A Case Study of a Melting Culture: The Bering Sea Natives' Struggle for Preservation and Meaningful Voice in the Face of Climate Change

Our subsistence lifestyle [is] our culture. Without subsistence we will not survive as a people [...]. If our culture, our subsistence lifestyle, should disappear, we are no more and there shall not be another kind as we in the entire world.

— John Active (Yup'ik)[157]

I. Introduction

Since time immemorial, the coastal Yup'ik and Inupiaq peoples have depended upon the Northern Bering Sea's marine ecosystem for their subsistence way of life.[158] Living beyond the climatic limits of agriculture, their subsistence practices of hunting and fishing atop sea ice not only supports their food security but also defines their culture —whereby traditional knowledge and practice is passed on from the elders of one generation to the youth of the next.[159] In recent years, however, the sea ice landscape has met unprecedented calamity, as the Bering Sea region is warming at more than twice as fast as the rest of the Earth's average and as temperatures are no longer, on average, freezing.[160] In turn, the tribes are forced to relocate inland and abandon traditional subsistence practices, and the continuity of the Bering Sea Natives' way of life is facing

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[157]. John Active, *Why Subsistence is a Matter of Cultural Survival: A Yupik Point of View*, Ronald Spatz, ed. 1999. *Alaska Native Writers, Storytellers and Orators, Expanded Edition*. Alaska Quarterly Review.

[158]. Bering Sea Elders Group, *Northern Bering Sea and Bering Strait: Food Security*, (2016) http://www.beringseaelders.org/wp-content/uploads/2016/11/N_Bering_Sea_food_security_med_res.pdf.

[159]. *Id*. Their limited cash economy is dependent upon the success of their small-scale commercial fisheries Bering Sea Elders Group, *Northern Bering Sea and Bering Straight: Ecosystem and Climate Change*, (2016), http://www.beringseaelders.org/wp-content/uploads/2016/11/N_Bering_Sea_Ecosystem-Climate-Change_med_res.pdf; *see also* Bering Sea Elders Group *The Northern Bering Sea: Our Way of* Life, (2011), http://www.beringseaelders.org/wp-content/uploads/2014/09/Northern-Bering-Sea-Marine-Mammal-Seabird-Migration-Map_med-res-2016.pdf; *See also* Encyclopedia Brittanica, *Yupik*, https://www.britannica.com/topic/Yupik (last updated Apr. 11, 2019);

[160]. *See* SR15 Article 3 (*explaining* that the arctic is experiencing more drastic heating. *See also* Yereth Rosen, *Alaska's hottest month portends transformation into 'unfrozen state'*, https://reut.rs/2KvCRnq.

imminent collapse.[161]

As the sea ice melts, the Bering Sea region and the Bering Sea Native's homeland faces increased vulnerabilities, brought about by the expansion of industrial fisheries, increased shipping, and offshore oil and gas development.[162] Since 2011, the Bering Sea Elders Group (which is a government consortium of tribal elders) have issued a series of resolutions calling upon the United States federal government to uphold its sovereign trust obligations for protection and for meaningful government-to-government consultation, prior to any action affecting their subsistence resources.[163] Yet, despite their persistent pleas for preservation and meaningful voice, the federal government has responded only inconsistently and, depending upon the political party in power, has even acted in direct opposition to the interest of the rising and future Bering Sea Natives.[164] The federal government's actions pose a substantial threat to the continuity of the Bering

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[161]. As sea ice melts and sea level rises mass erosions and storm surges, the Alaskan Natives' culture and subsistence way of life becomes diminished.

[162]. Bering Sea Elders Group, *Issues: Front Edge of Climate Change*, http://www.beringseaelders.org/issues/ (last visited Apr. 29, 2019); *see also* International Arctic Research Center, *In the coastal communities near the Bering Strait, a winter unlike the rest*, (April 8, 2018), https://www.climate.gov/news-features/features/coastal-communities-near-bering-strait-winter-unlike-rest.

[163]. Bering Sea Elders Group, 10 Key Reasons to Protect the Northern Bering Sea and Bering Strait, (November 10, 2016), http://www.beringseaelders.org/wp-content/uploads/2016/11/10-Key-Reasons-to-Protect-the-Northern-Bering-Sea-Bering-Strait.pdf. *See generally* Bering Sea Elders Group, *Links & Publications: Bering Sea Elders Group Resolutions*, http://www.beringseaelders.org/links/ (last visited Mar. 12, 2019). Such consultation will inform decision-makers, in the face of climate change, with the knowledge of how the tribes live with the ocean and the traditional knowledge necessary to pass on to their children so that they may continue to prosper and continue in their traditional culture.

[164]. The revocation violated the federal government's fiduciary obligations to protect the Alaskan Natives' subsistence and culture under the federal Indian Trust. *See Generally* U.S. Department of the Interior, Bureau of Indian Affairs, *Frequently Asked Questions*, http://www.bia.gov/FAQs/index.htm (last visited Mar. 11, 2019). *See generally*, Hope Babcock, *Here Today, Gone Tomorrow—Is Global Climate Change Another White Man's Trick to Get Indian Land? The Role of Treaties in Protecting Tribes as They Adapt to Climate Change*, 2017 Mich. St. L. Rev. 371; *See also* Rebecca Tsosie, *Climate Change, Sustainability, and Globalization: Charting the Future of Indigenous Environmental Self-Determination*, Environment & Energy Law & Policy Journal, Vol. 4, No. 2, p. 188, 2009, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1865987; See also Whyte, Kyle Powys, 2016, "Is it Colonial Déjà Vu? Indigenous Peoples and Climate Injustice" in *Humanities for the Environment: Integrating Knowledge, Forging New Constellations of Practice*, Joni Adamson and Michael Davis (eds), London, Routledge, 88–105. Heyward, Clare, 2014, "Climate Change as Cultural Injustice", in *New Waves in Global Justice*, Thom Brooks (ed.), London: Palgrave Macmillan UK, 149–169. doi:10.1057/9781137286406_8.

Sea Natives' culture and present critical questions of intergenerational climate justice. This chapter emphasizes the inherent aspects of the federal government's ability to govern —which highlights the ethical and legal decision-space that constrains the federal government actions in a democracy when contemplating the impending conditions (including, in this instance, the identity, sovereignty, and heritage of indigenous communities) of those most vulnerable among the rising and future generations.[165]

This chapter is organized into six sections, including this introduction. Section II covers the background and context with regards to the impacts of climate change in the region, the Bering Sea Elders Group, and the general rights of Alaskan Natives. Section III examines the Elders Group's protection and consultation demands to the executive branch with the responses from both the Obama and Trump Administrations. Section IV examines the Elders Group's demands to the legislative branch with its response. Section V concludes that the political branches of the federal government, regardless of the priorities of those in power, remain constrained within an ethical and legal decision-space of intergenerational climate justice to undertake only those actions that ensure the protection and meaningful voice of the Bering Sea Natives. This understanding needs to be emphasized and implemented under existing legal structures, not only in this instance but also for general application for the interests of all rising and future generations.

II. Background and Context

A. Climate Change and the Bering Sea Region

The Bering Sea Region is composed of a highly productive ecosystem that depends on the predictive annual cycle of seasonal sea ice.[166] The annual cycle consists of ice formations developing in the early fall, thickening throughout the winter, and

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[165]. Many important questions are raised throughout this case study and extend beyond the scope of this chapter and dissertation: What are the consequences of forced migration to people leaving their homelands, concerning the increased dislocation, community instability, forced migration, and loss of self-determination.

[166]. Bering Sea Elder Group, *10 Key Reasons to Protect the Northern Bering Sea and Bering Strait*, (November 10, 2016), http://www.beringseaelders.org/wp-content/uploads/2016/11/10-Key-Reasons-to-Protect-the-Northern-Bering-Sea-Bering-Strait.pdf.

gradually retreating during the spring.[167] At peak winter months, the Bering Sea Region is historically composed of a blanket of white, snow-covered ice—consisting of sheets of thick pack ice with patches of broken ice floes that extend to the open water areas.[168] These ice floes are driven by persistent northerly winds fueled by the continuous low-pressure systems that blow from the Arctic Ocean across the Bering Strait.[169]

During the spring months, the frozen landscape is coupled with a living scenery, which consists of one of the largest marine migrations on Earth.[170] The Bering Sea Region is a seasonal habitat for, among others: bowhead and beluga whales; walruses; bearded, spotted, and ringed seals; and spectacled eiders.[171] The spring melt combines with massive plankton blooms which sustains a living seafloor and attracts schools of fish, gray whales, and millions of migratory birds flying to nesting grounds.[172]

SR15 explained, with "high confidence[,]" that "warming greater than global annual average is being experienced in many land regions and seasons, including two to three times higher in the Arctic."[173] Since records began in 1900, within this past decade (2011-2021), the Bering Sea Region has reached its all-time warmest levels.[174] Such intense warming is causing observable changes in the timing, duration, and extent of seasonal sea ice.[175] The associated ecological transformation is causing sea floor communities and fish species to shift northward and to dwindle—causing marine

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167. *Id*.

168. *Id*.

169. *Id*.; *see also* Nicholas Bond, *Bering Climate*, https://www.beringclimate.noaa.gov/essays_bond.html (last visited April 11, 2019).

170. Ocean Conservancy, *One of the Biggest Arctic Migrations You've Never Heard of*, (May 12, 2014), https://oceanconservancy.org/blog/2014/05/12/one-of-natures-wonders-spring-migration-in-the-arctic/.

171. *Id*.

172. *Id*.; In the St. Lawrence Island Yupik language, the migration phenomenon is called katawhsaqa or "pouring out" because of the profusion and movement of marine life. *Id*.

173. SR15 explained, with "high confidence[,]" that "warming greater than global annual average is being experienced in many land regions and seasons, including two to three times higher in the Arctic." IPCC Summary for Policymakers, *Special Report: Global Warming of 1.5 ºC*, 6 (2018), https://www.ipcc.ch/sr15/chapter/summary-for-policy-makers/.

174. Yereth Rosen, *Alaska's hottest month portends transformation into 'unfrozen state'*, https://reut.rs/2KvCRnq.

175. *See* Nicholas Bond, *Bering Climate: What differences have occurred in summer and winter weather in the Bering Sea in the past 30 years?*, https://www.beringclimate.noaa.gov/essays_bond.html (last visited Mar. 18, 2019).

mammals and seabirds to then search elsewhere for prey.[176] For the tribes, the consequences are devastating, as many have reported that, aside from the increased exposure to storm surges and coastal erosion, the thinning sea ice is making hunting in traditional locations almost impossible, and other attempts at traditional hunting and fishing have been completely unsuccessful.[177]

B. The Bering Sea Elders Group

The Bering Sea Elders Group is a tribal consortium comprised of thirty-nine federally recognized Tribes located on the western coast of Alaska—within the Bering Sea Region (*See* Figure 2.1). Oral history tells of how the "origins of war" had stemmed from an altercation among these tribes, whereby a member of one tribe intentionally blinded a man of another—causing the worst of harms—preventing that man from subsistence hunting.[178] Yet, despite past hostilities, in 2007, the tribes united and established the Bering Sea Elders Group for the common purpose of protecting their subsistence practices by working with the federal government to create a bottom trawl boundary to prevent industrial fishing fleets from moving into waters where they had not previously operated.[179]

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[176]. *Id*.

[177]. Bering Sea Elders Group, *Northern Bering Sea and Bering Strait: Food Security*, (2016) http://www.beringseaelders.org/wp-content/uploads/2016/11/N_Bering_Sea_food_security_med_res.pdf.

[178]. A cultural anthropologist, Ann Fienup-Riordan, documented numerous traditional Yupik oral histories in the 1970-1980s. Among the stories is the *Origins Of War: Yup'ik People Going to War against One Another.* Here, the oral stories emphasized that the origin of war is associated with blindness. That is, there were once two boys who were playing with bone-tipped darts in the qasgi (men's house) while their fathers sat working beside them. One of the boys aimed poorly and accidentally hit his companion in the eye, blinding him. This, in turn, led the father of the blinded son to blind the father of the other son which then led to the blinded father's inability to practice subsistence hunting. George Amokon, (February 26, 1984). *Interview 71*, BIA-ANCSA Office, Anchorge, Alaska, http://www.surrealstudios.com/cec/NEH%20Text.pdf.

[179]. Alaska Marine Conservation Council, Northern Bering Sea Initiative, 2007 https://www.akmarine.org/fisheries-conservation/protect-habitat/northern-bering-sea-initiative/ (last visited April 6, 2019).

Figure 2.1 A map depicting the Bearing Sea Region with the names and locations of the thirty-nine tribes comprising the Bearing Sea Elders Group.[180]

The Bering Sea Elders Group held its first summit in 2011, with all thirty-nine participating tribes at the Yupiit Piciryarait Cultural Center in Bethel, Alaska.[181] The Elders Group declared their mission as follows: "[T]o speak and work together as one voice to protect and respect [their] traditional ways of life, the ocean web of life that supports the resources [they] rely on, and [their] children's future."[182] Their goal, the Elders Group explained, is to "serve as [] messenger[s] to [their] children, tribal councils, and government decision-makers."[183] In turn, the Elders Group share a vision "guided by

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[180]. Bering Sea Elders Group, *Waqaa. Quyanaqpak qaipplutiin. Welcome to Bering Sea Elders Group*, http://www.beringseaelders.org (last visited April 6, 2019).

[181]. Bering Sea Elders Group, *Spring Newsletter 2012: Report from the Elders Group Summit*, (2012) http://www.beringseaelders.org/wp-content/uploads/2014/10/newsletter-spring-2012.pdf. This was the first ever full gathering of elders from both the Yukon-Kuskokwim and Bering Strait regions.

[182]. *Id*.

[183]. Bering Sea Elders Group, *About Us*, http://www.beringseaelders.org/about-us/ (last visited Apr. 29, 2019).

the right of Yupik and Inupiaq peoples to hunt and fish in traditional territory, the enduring cultural practices such as passing on traditional knowledge to the next generation, [and] the importance of safeguarding ocean resources that provide for the[ir] way of life."[184]

C. General Rights of Alaskan Natives

In 1971, Congress passed the Alaska Native Claims Settlement Act (ANCSA), which recognized Alaska Natives' title to millions of acres of land and compensated them for the cession of the remaining portion of Alaska.[185] With that, ANCSA also extinguished aboriginal hunting and fishing rights on Alaska's mainland.[186] However, the Ninth Circuit has held that ANCSA did not extinguish any preexisting aboriginal rights on the Outer Continental Shelf.[187] And, the United States Supreme Court has ruled that rights not explicitly ceded by a tribe to the federal government are reserved by that tribe.[188] Thus, the Bering Sea Natives' retain the right to their subsistence resources where they have not otherwise been limited.[189]

In 1980, Congress passed the Alaska National Interest Lands Conservation Act (ANILCA), which codified the federal government's trust obligations afforded to the

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184. The Elders Group seeks to retain what local small-scale commercial fisheries the tribal villages have left. The Elders Group explained that "traditional practices are based on respect for what the ocean provides […], and [r]espect for the natural world and caring for resources are the basis for continued opportunity to thrive off the ocean and land." The Elders Group's primary focus is to retain the various tribes' food security by way of "harvesting food resources from ancestral hunting grounds" based on "local knowledge and place-based expertise." The Elders Group further explained that their "survival, shaped culture" is reliant upon the success of the harvest, which is wholly dependent on the predictability of the year-to-year variability in ocean and ice conditions and the movement of species. Native communities engage in small-scale commercial fisheries in which "harvesting and processing of local seafood provides jobs and opportunity that supports families in the mixed subsistence and cash economy." Bering Sea Elders Group, *Food Security*, http://www.beringseaelders.org/wp-content uploads2016/11N_Bering_Sea_food_security_med_res.pdf (last visited Mar. 18, 2019).

185. *See* 43 U.S. Code Ch. 33.

186. *Id*.; This doctrine supports Alaskan Natives' rights to marine subsistence resources where they have not otherwise been limited. *See* Amoco Production Co. v. Gambell, 480 U.S. 531, 533, 17 ELR 20574 (9th Cir. 1987).

187. *See Amoco Production Co. v. Gambell*, 480 U.S. 531, 533 (9th Cir. 1987); *See also* Village of Gambell v. Hodel, 869 F.2d 1273 (9th Cir. 1989).

188. *See generally* United States v. Winans, 198 U.S. 371 (1905); *see also* Winters v. United States, 207 U.S. 564 (1908).

189. *See Amoco Production*, 480 U.S. at 533.

Alaskan Natives with respect to subsistence resources.[190] ANILCA explicitly stated that "[t]he continuation of the opportunity for subsistence uses by rural residents of Alaska […] on the public lands and by Alaska Natives on Native lands is essential to Native physical, economic, traditional, and cultural existence […]."[191] In short, under ANILCA, Congress mandated the federal government's trust responsibility in safeguarding the Alaskan Natives' subsistence rights.[192]

Under ANILCA, the United States Department of the Interior (DOI) is charged with the duty to protect the Alaskan Natives' lands and subsistence resources.[193] The DOI, through its Bureau of Indian Affairs, articulated the federal Indian Trust responsibility as follows: "[It is] a legally enforceable fiduciary obligation on the part of the United States to protect tribal treaty rights, lands, assets, and resources, as well as a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes and villages."[194]

Pursuant to their trust responsibilities, all federal government agencies are obliged to meaningfully consult with Alaskan Native tribal officials on any federal policy, regulatory, or legislative actions that may have substantial effects on the tribes' subsistence resources, their relationship with the federal government, or the distribution of power between tribes and the federal government.[195] Alaskan Natives have engaged in prior litigation which emphasized the importance of their outer continental shelf subsistence practices and the harm resulting from many federal government programs.[196]

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190. U.S. Department of the Interior, *Federal Subsistence Management Program: ANILCA*, https://www.doi.gov/subsistence/library/anilca (last visited Mar. 18, 2019).

191. ANILCA, Pub. L. No. 96-487, 94 Stat. 2371 (1980).

192. James Ness, *The Federal Trust Doctrine—Realizing Chief Justice Marshall's Vision,* https://www.doi.gov/pmb/cadr/programs/native/gtgworkshop/The-Federal-Trust-Doctrine (last visited Mar. 18, 2019).

193. *Id*.

194. U.S. Department of the Interior, Bureau of Indian Affairs, *Frequently Asked Questions*, http://www.bia.gov/FAQs/index.htm (last visited Mar. 11, 2019).

195. The requirement to meaningfully consult with the tribes derives from the federal government's trust responsibilities. *See* Greta Swanson et. al., *Understanding the Government-to-Government Consultation Framework for Agency Activities that Affect Marine Natural Resources in the Arctic*, 43 Envtl. L. Rep. News & Analysis 10872, 2013, 4. *Id*. at 6.

196. *See People of the Village of Gambell v. Hodel*, 869 F.2d 1273, 1275 (9th Cir. 1989).

However, the Natives ultimately failed to secure lasting injunctive protections by way of the court, and they now place their remaining hope in the political branches to uphold their trust obligations.[197]

III. Analysis: The Bering Sea Natives' Struggle for Preservation and Meaningful Voice in the Face of Climate Change

A. The Undependable Executive Branch

In 2011, the Elders Group adopted a Resolution for presentation to the Obama Administration, captioned: "Expressing a Vision for the Northern Bering Sea."[198] This Resolution insisted that the federal government reserve a sea ice boundary and undertake a tribal consultation process for all decisions affecting the Northern Bering Sea.[199] The Obama Administration was initially unresponsive, so, in 2014, the Elders Group adopted a follow-up Resolution, captioned: "Stronger and More Lasting Protection of Tribal Subsistence Resources in the Northern Bering Sea and to Ensure Tribal Self-Determination for Decisions Impacting These Resources."[200] This Resolution demanded that the Obama Administration "ensure the protection of marine resources, to promote the self-determination of [their] People in the future management of these resources and habitat[,]" and to "engage in formal government-to-government consultation with Northern Bering Sea Tribal Governments."[201]

In 2016, the Elders Group adopted yet a third Resolution, simply captioned:

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197. The *Cobell* case provides further insight into the trustee role. This chapter also recommends that the Elders Group bring further judicial action demanding the judiciary to hold the political branches of the federal government accountable to their fiduciary obligations owed to the Alaskan Natives. *But see generally* United States v. Mitchell, 463 U.S. 206 (1983) (*examining* whether a particular federal statute involving Indian trust property gives rise to a cause of action for an alleged breach of trust by the federal government).

198. Bering Sea Elders Group, *Resolution Expressing a Vision for the Northern Bering Sea,* (November 3, 2011), http://www.beringseaelders.org/wp-content/uploads/2014/09/northern-bering-sea-resolution-11-11.pdf.

199. *Id*.

200. Bering Sea Elders Group, *Resolution for Stronger and More Lasting Protection of Tribal Subsistence Resources in the Northern Bering Sea and to Ensure Tribal Self-Determination for Decisions Impacting These Resources*, (September 10, 2014), http://www.beringseaelders.org/wp-content/uploads/2014/10/Northern-Bering-Sea-resolution-09-14-final1.pdf.

201. *Id*.

"Bering Sea Elders Group Resolution."[202] This Resolution once again reiterated the demand to "regain and sustain tribal safety and food security […] and to promote the self-determination of [their] people in the management of natural resources."[203] The demand for consultation, however, differed from the prior Resolutions, in that it explicitly demanded an executive order designating a resilience area covering the Bering Sea Region—which seemed to be effective.[204] The scope of this resolution was discussed with the Obama Administration before being adopted, and there was some back and forth after the first two Resolutions that led to agreement on this one.

1. President Obama's Executive Order (2016)

On December 9, 2016, in direct response to the third Resolution, President Obama issued *Executive Order 13754*,[205] creating the Northern Bering Sea Climate Resilience Area (*See* Figure 2.2).[206] The Resilience Area reserved 112,300 square miles of protected area and mandated regular consultation processes with the Elders Group for all decisions affecting the designated area.[207] This Order advanced the Administration's priorities of "elevating traditional knowledge in decision making and coordinating Federal efforts in the Arctic."[208] With that, the Order established a "Task Force" under the Arctic Executive Steering Committee.[209] The Task Force was designed to coordinate federal activity with

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202. Bering Sea Elders Group, *Resolution*, (June 15, 2016) http://www.beringseaelders.org/wp-content/uploads/2017/01/Bering-Sea-Elders-Group-NBS-Resolution-signed-06-15-16.pdf.

203. *Id*.

204. *Id*.

205. Office of the Press Secretary, *Executive Order -- Northern Bering Sea Climate Resilience,* (December 09, 2016), https://obamawhitehouse.archives.gov/the-press-office/2016/12/09/executive-order-northern-bering-sea-climate-resilience.

206. Oceana, *Northern Bering Sea Climate Resilience Area*, https://usa.oceana.org/northern-bering-sea-climate-resilience-area (last visited Mar. 18, 2019).

207. *See* Bering Sea Elders Group, *Northern Bering Sea Climate Resilience Area*, http://www.beringseaelders.org/our-work/northern-bering-sea-climate-resilience-area/ (last visited Mar. 12, 2019).

208. *Id*. The Executive order reflected closely the Tribes' concerns with respect to the Arctic's natural and cultural resources through the use of science-based decision making and enhanced coordination.

209. Office of the Press Secretary, *FACT SHEET: White House Announces Actions to Protect Natural and Cultural Resources in Alaskan Arctic Ocean*, (December 09, 2016), https://obamawhitehouse.archives.gov/the-press-office/2016/12/09/fact-sheet-white-house-announces-actions-protect-natural-and-cultural.

the Elders Group and consider additional mechanisms to reduce impacts to subsistence and cultural activities within the Resilience Area.[210] Beyond that, the Order explicitly stated that "[t]ogether, these groups will guide the incorporation of valuable traditional knowledge and science into Federal resource management in the northern Bering Sea region, thus preserving this unique ecosystem and the indigenous peoples who rely upon it."[211]

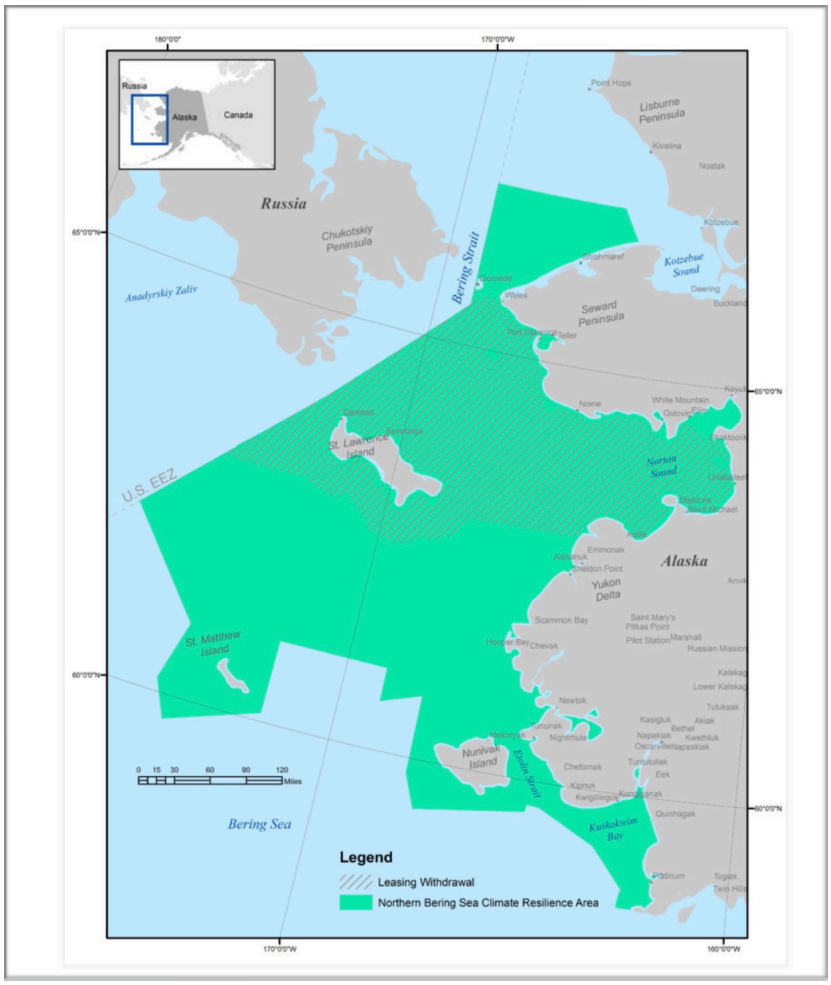

Figure 2.2 A map depicting (in green) the Northern Bering Sea Climate Resilience Area and (with grey stripes) the federal government's leasing withdrawals associated with its designation.[212]

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[210]. *Id.*

[211]. *Id.*

[212]. Bering Sea Elders Group, *Northern Bering Sea Climate Resilience Area*, http://www.beringseaelders.org/our-work/northern-bering-sea-climate-resilience-area/ (last visited Mar. 17, 2019).

2. President Trump's Executive Order (2017)

Less than five months later, on April 28, 2017, President Trump—without any form of consultation whatsoever—issued *Executive Order 13795*, which expressly revoked the Resilience Area and opened the ancestral waters of the Northern Bering Sea to, among other industrial activities, an intense leasing program for oil and gas development.[213] As part of his "America First" policy, President Trump's Order was described as:

> the first step toward opening previously-protected parts of the Outer Continental Shelf to oil and gas exploration by revoking or modifying previous executive orders and memoranda, streamlining permitting processes for oil and gas exploration, restricting expansion of the National Marine Sanctuary program, and reviewing or reconsidering existing worker safety and environmental laws.[214]

The Elders Group responded with a stern message of condemnation:

> The Department of the Interior [...] has promised the Bering Sea Elders Group time and again that it would meaningfully consult with Tribes and communities on any proposal to drill in our region's waters, but [this] announcement indicates the Administration [...] [has] not listened to the unanimous opposition we have voiced. It is not clear to us why our many requests have been ignored. […] Our people and our way of life are being exposed to danger and we do not understand why.[215]

To the Elders Group, the executive branch's promises of protection and meaningful voice were seemingly illusory, for just as soon as a new administration took office, protection was stripped and the tribes were denied of any sense of mutual

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[213]. Federal Register, *Executive Order 13795 — Implementing an America-First Offshore Energy Strategy*, (May 3, 2017), https://www.federalregister.gov/documents/2017/05/03/2017-09087/implementing-an-america-first-offshore-energy-strategy. see also Federal Register, *Implementing an America-First Offshore Energy Strategy*, (May 3, 2017), https://www.federalregister.gov/documents/2017/05/03/2017-09087/implementing-an-america-first-offshore-energy-strategy. see also Sam Pickerill, *Implementing an America-First Offshore Energy Strategy (Executive Order 13795)*, https://scipol.duke.edu/track/dcpd-201700287-executive-order-13795-implementing-america-first-offshore-energy-strategy-0 (last visited Mar. 18, 2019).

[214]. *Id*.

[215]. Bering Sea Elders Group, *Press Release*, (January 5, 2018) http://www.beringseaelders.org/wp-content/uploads/2018/01/2018-01-05-BSEG-Press-Release-Final.pdf.

cognizance regarding actions affecting their subsistence resources.[216] Referring back to Chapter 1, and the ethical and legal constraints of intergenerational climate justice, the application to the federal government in this context, the executive branch, regardless of the priorities of the political party in power, is constrained within an ethical and legal decision-space to uphold its obligations to the Bering Sea Natives, even when faced with instability and accelerating change. As of now, even with the Biden Administration (with Deb Haaland now serving as the first Native American Secretary of the Interior), the Bering Sea Natives' lack of consistent reliance afforded to the executive branch to fulfill its trust responsibilities makes the promises for protection and meaningful voice seemingly ephemeral.[217]

This is not how these trust obligations work—that is, the federal government cannot just opt out—where failing to uphold these trust responsibilities indicates corruption in the system. The duty of the federal government as trustee imposes a much higher obligation (that of a fiduciary) to protect the land and resources of a Tribe. This obligation not only distinguish this case study from the intergenerational climate, but makes it a much stronger case for action for intergenerational climate justice. If the executive and legislative branches will not act to address intergenerational harm under their combined ethical and trustee obligations, it seems unlikely that they would do so under merely their current vague ethical obligations.

B. The Unresponsive Legislative Branch

In 2018, in a desperate attempt to retain their livelihood, the Elders Group called upon Congress to uphold its trust obligations for protection and meaningful voice. In doing so, the Elders Group pinpointed two acts of Congress—namely, the Magnuson-

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[216]. Eleanor Huffines, *7 Things to Know About the Northern Bering Sea Climate Resilience Area*, https://www.pewtrusts.org/en/research-and-analysis/articles/2016/12/09/7-things-to-know-about-the-northern-bering-sea-climate-resilience-area (last visited Mar. 18, 2019).

[217]. Bering Sea Elders Group, *Resolution Reaffirming Request to Reinstate the Provisions of the Executive Order Creating the Northern Bering Sea Climate Resilience Area, September 2018*, http://www.beringseaelders.org/wp-content/uploads/2018/09/2018-09-20-BSEG-Resolution-2018-3-Reinstate-EO-Final.pdf (Elders Group requests that legislation be passed immediately that is identical to Executive Order 13754 or is more protective than the terms in that Order).

Stevens Act (MSA) and Outer Continental Shelf Lands Act (OCSLA)—that, they argue, could be amended to guide the executive agencies to respect, protect, and fulfill their desired ends. The following subsections examine these two acts in this context and analyze the legislative branch's responses.

1. The Magnuson-Stevens Act Reauthorization Amendment

Congress first enacted legislation affecting the Bering Sea Natives' subsistence resources in 1976 with the passing of the MSA. The MSA is a federal law that governs fisheries management in offshore waters.[218] The MSA management includes catch limits, rebuilding of fish stock, and habitat and ecosystem assessments.[219] Although Alaska Natives have a subsistence priority under ANILCA, the MSA does not explicitly require any consideration of Native subsistence protection, nor does it impose tribal consultation requirements in the Act itself.[220] The Elders Group insisted that these requirements be made explicit in the text of the MSA, as a lasting, forward looking policy.

In September 2018, the House passed H.R.200, which included management plans that were seemingly consistent with the substantive demands put forth by the Elders Group.[221] That is, it provided for ample bans and protection from large scale fisheries from using practices such as bottom trawling within the Bering Sea Region.[222] However, the Elders Group opposed the overall bill resolution because it was missing a key

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218. NOAA Fisheries, *Magnuson-Stevens Fishery Conservation and Management Act*, https://www.fisheries.noaa.gov/resource/document/magnuson-stevens-fishery-conservation-and-management-act (last visited Apr. 29, 2019).

219. *Id.*

220. NOAA Fisheries, *Law and Policies: Magnuson-Stevens Act*, https://www.fisheries.noaa.gov/topic/laws-policies (last visited Mar. 18, 2019).

221. H.R.200 is secured as follows: "Strengthening Fishing Communities and Increasing Flexibility in Fisheries Management Act (A bill to amend the Magnuson-Stevens Fishery Conservation and Management Act to provide flexibility for fishery managers and stability for fishermen, and for other purposes; to the Committee on Natural Resources." "On 07/12/2018 Received in the Senate and Read twice and referred to the Committee on Commerce, Science, and Transportation." "On 07/11/2018 *Unanimous Consent Request*—Mr. Young (AK) asked unanimous consent that the engrossment of the bill, H.R. 200, the Clerk be authorized to make technical corrections and conforming changes to the bill." The technical corrections was place at the desk and reads as follows: Page 14, line 15, strike "including". "Agreed to without objection." *See* H.R.200, 115th Congress (2017-2018), https://www.congress.gov/bill/115th-congress/house-bill/200.

222. *Id.*

provision—that is, a requirement for the federal government to consult with the tribes.[223] Specifically, the Elders Group demanded that,

> when [the] United States Senate considers Magnuson-Stevens Act Reauthorization, it [must] include[]: (1) a requirement for consultation with Tribes with regard to fishery management decisions on a government-to-government basis; (2) a requirement that the federal government includes Indigenous Knowledge in its decision-making, and (3) a requirement that the North Pacific Fishery Management Council include one full voting membership seat that must be held by an elected Tribal leader from Alaska.[224]

Congress did not respond to the Elders Group's opposition nor did the bill become law, and, to make matters worse, in December 2018, the Modern Fish Act (MFA) passed the Senate and House and was signed by President Trump.[225] The MFA, by once again failing to consult with the tribes, addressed the federal management of recreational fishing, stemming from non-native concerns over shortened or cancelled seasons and reduced bag limits which largely affects the Bering Sea Natives' subsistence resources.[226]

With respect to the legislative branch and consultation, other than access to your elected officials as with any citizen and designated committees do consultation, think of consultation is mainly an executive branch function. The executive branch role has a critical role in the MFA— NOAA Fisheries provides the technical role—and they certainly have a trustee obligation to consult. It is not clear why Congress declined to include a formal consultation process in either the MSA reauthorization or the MFA, although two possibilities seem likely. First, there might have been problems formulating what a good-faith consultation process would entail. Second, and more substantively, Congress was probably loathe to pass anything that undercut its own authority. That is, if Congress were to consult with the tribes, it would likely have to compromise its own

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[223]. Bering Sea Elders, *Resolution on the Reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act*, (September 20, 2018), http://www.beringseaelders.org/wp-content/uploads/2018/09/2018-09-20-BSEG-Resolution-2018-1-MSA-Final.pdf.

[224]. *Id*.

[225]. Congressional Record—Senate, *Modernizing Recreational Fisheries Management Act,* S. 1520, (December 17, 2018), https://www.congress.gov/115/crec/2018/12/17/CREC-2018-12-17-pt1-PgS7658-2.pdf.

[226]. *Id*.

interests (most often synonymous with industrial and economic interests—benefiting the present generation) with that of the Bering Sea Natives' interests. The argument that the Bering Sea Natives' subsistence resources are being properly managed by the federal government may be another factor—that is, the tribes are not elected by (and therefore, theoretically accountable to) the citizens of the United States as a whole. However, this reason is not particularly compelling here, because the demand was simply for a good-faith consultation process. To have a tribal representative on the committee when others have no vote in tribal elections might be politically difficult, but there are numerous Pacific Northwest examples of tribes represented on various fisheries management entities, with meaningful consultation and outcomes.

2. The Outer Continental Shelf Lands Act

OCSLA governs both oil and gas and renewable energy development on the Outer Continental Shelf.[227] Federal interest in the Outer Continental Shelf historically focused on developing oil and gas reserves and ensuring that the area was open to trade and commerce.[228] In addition to contributing to the cumulative cause of climate change, increased oil and gas development has drastically impacted the Bering Sea Natives' subsistence resources.[229] For example, the northern Bering Sea is a sensitive acoustic environment, where marine mammals use sound to locate food and to navigate.[230] The sound disruptions caused by oil location and drilling "inhibit the animals from migrating through the region and thus prevent the Alaskan Natives' from making necessary catches for subsistence."[231]

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[227]. Bureau of Ocean Energy Management, *OCS Lands Act History*, https://www.boem.gov/OCS-Lands-Act-History/ (last visited Mar. 18, 2019).

[228]. *Id*.

[229]. *See supra* note 19.

[230]. Stafford, K. 2013. Anthropogenic Sound and Marine Mammals in the Arctic. Prepared for The Pew Charitable Trusts' U.S. Arctic Program, http://www.pewtrusts.org/en/projects/protecting-life-in-the-arctic/arctic-science/arctic-science-initiatives/anthropogenic-sound-and-marine-mammals-in-the-arctic.

[231]. *Id*.

OCSLA does not require consultation with tribes for oil and gas development.[232] However, OCSLA does allow opportunities for interested parties to provide input.[233] These include requirements for public comment, input from states and local governments, consultation with parties with interests in the outer continental shelf, and cooperative agreements with states.[234] So, while the statute does not specifically require consultation with tribes, Alaskan tribes could potentially participate in one of these opportunities, as they are members of the public, local governments, and parties with interests in the outer continental shelf.[235] Nevertheless, these sweeping provisions are not sufficient, as the Bering Sea Natives are owed special protection and meaningful voice as part of the federal government's ethical and legal obligations, not to be conflated as only as authorized under a statute or regulation.

This underlines the importance of Congress speaking directly to the precise question at issue in this case, clear and unambiguously expressed. When this happens, legislation controls the circumstances and no delegation is afforded to the individual agencies of the executive branch. With that, Congress should not only amend MSA and OCSLA to explicitly align with its intergenerational climate justice responsibilities to require subsistence protection and formal, good-faith, consultation processes for all decisions affecting the Bering Sea Natives' ancestral region, but it should also enact legislation essentially reinstating the protection and consultation requirements as laid out in President Obama's 2016 Executive Order. Such participation will likely feed into the betterment of government-to-government relations by ensuring the tribes, if exercised properly, with inclusion, which will likely enhance the legitimacy and trust of further federal government actions. In turn, the federal government may be held to account, and the tribes will have a clear path for procedural review and recourse for grievances moving forward.

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232. *See* 43 U.S.C. Subchapter III, Outer Continental Shelf Lands.
233. *Id*.
234. *Id*.
235. *Id*.

IV. Conclusion

As the sea ice landscape melts, the Bering Sea Natives' subsistence practices and the continuity of their culture is increasingly threatened, raising critical questions of intergenerational climate justice. The Elders Group has issued a series of resolutions demanding that the federal government uphold its trust obligations for protection and meaningful voice regarding all actions affecting their subsistence resources. Yet, the federal government has acted only inconsistently, dependent upon the political party in power, and has even taken actions that exacerbate the problem. Although the federal government's obligations are often overshadowed by reliance on explicit language of statutory and regulatory interpretation, it remains bound within an ethical and legal decision-space and can neither legislate away its requirements nor may the executive use its discretion to take actions that are detrimental to the rising and future Bering Sea Natives' interests.

Just as the federal government cannot abdicate its trust responsibilities owed to the Bering Sea Natives, the public trust doctrine and fundamental constitutional rights are legal tools that can be used to ensure the federal government uphold its obligation of intergenerational climate justice for all rising and future generations. *Juliana v. United States* is a landmark climate change litigation that is actively seeking the lasting power of a declaration of law by the judicial branch, which can offer an overarching mandate to explicitly secure the demands of intergenerational climate justice for the benefit of all rising and future generations. That is, the judicial branch could produce a declaration of law that cannot be ignored or rejected by future presidential administrations or political majorities.[236] With that in mind, the following chapter analyzes the substantive aspects of this ongoing, strategic climate change case.

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[236]. This strategic climate change litigation has already paved the way for lawsuits to be filed against governments around the world, where countries have achieved favorable decisions by replicating this strategic litigation. More than 1,300 climate cases have been brought in twenty-nine nations around the world, including in: Belgium, Ireland, New Zealand, Norway, Switzerland, Pakistan, Portugal, the United Kingdom, Germany, France, Canada, Colombia, Argentina, Brazil, and Turkey. *See* http://www.abajournal.com/magazine/article/lawyers-are-unleashing-a-flurry-of-lawsuits-to-step-up-the-fight-against-climate-change.

Chapter 3: The Children's Climate Lawsuit (Part 1): A Critique of the Substance of the Preeminent Atmospheric Trust Litigation Case, Juliana v. United States[237]

Exercising my reasoned judgment, I have no doubt that the right to a climate system capable of sustaining human life is fundamental to a free and ordered society.

— District Court Judge Ann Aiken (2018)[238]

I. Introduction

Juliana v. United States is a case concerning climate change and the federal government's obligation to address it.[239] On its surface, the *Juliana* case is a lawsuit seeking to compel the government to implement a national, science-based, climate recovery plan designed to reduce atmospheric CO_2 concentrations below 350 ppm by the year 2100.[240] Below the surface, the plaintiffs, a group of twenty-one youths represented by a non-profit organization called Our Children's Trust, are seeking a declaration of a fundamental right to a climate system capable of sustaining human life.[241] With that, the children are demanding that the government be held liable, as fiduciaries, to maintain an atmosphere free of substantial impairment.[242] As the *Juliana* court aptly stated in its opening line—"[t]his is no ordinary lawsuit."[243]

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237. Adaptation from the original: Bronson J. Pace, *The Children's Climate Lawsuit: A Critique of the Substance and Science of the Preeminent Atmospheric Trust Litigation Case, Juliana v. United States*, 55 IDAHO L. REV. 85 (2019).

238. *See generally* Juliana v. United States, 217 F. Supp. 3d 1224, 1234 (D. Or. 2016).

239. *Id.*

240. *Id.*; Carbon dioxide, abbreviated as CO2, is a colorless and odorless gas produced by burning carbon and other organic compounds. NAT'L CTR. FOR BIOTECHNOLOGY INFO., *Carbon Dioxide*, PUBCHEM, https://pubchem.ncbi.nlm.nih.gov/compound/carbon_dioxide#section=Pharmacology-and-Biochemistry (last visited Mar. 18, 2019). Parts per million (ppm) is a unit of measurement frequently used by scientists to measure the concentration of contaminants in the atmosphere. *Id.*

241. *See Juliana v. U.S. – Climate Lawsuit*, OUR CHILDREN'S TRUST, https://www.ourchildrenstrust.org/us/federal-lawsuit/ (last visited Mar. 18, 2019).

242. *Id.*

243. *Juliana*, 217 F. Supp. 3d. at 1234.

The initial *Juliana* opinion was written in 2018 by Judge Ann Aiken in the District Court for the District of Oregon.[244] Judge Aiken's task was to review the United States' motion to summarily dismiss the children's claims. This case presents intriguing legal and social questions of intergenerational climate justice and is potentially far-reaching with respect to its impact on environmental law jurisprudence. This is a case of first impression, and it is important because of (1) what it is about—the rights of rising and future generations to a viable atmosphere, and (2) the legal tool the children attempt to use—that is, that protecting this right is the obligation of the government as trustee for the public trust.[245]

The children's lawsuit is part of the much larger Atmospheric Trust Litigation movement. With the purpose of spotlighting intergenerational climate justice, this global movement invokes the judiciary to act as the vehicle to mitigate common pool resource deterioration in the face of climate change. This novel approach to litigation recognizes the limitations to current governance and obstacles to action and finds a unique legal avenue to demand government action. This chapter explores this strategic litigation to improve an understanding of the ways law, science, and society entwine—a comprehension that may improve legal and social outcomes for uncertain and complex, intergenerational issues such as climate change.

This chapter is structured into five main parts, beginning with Part I, this introduction. Part II covers the facts of the case, prior and subsequent history, and the

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244. *Id.* at 1233.

245. The children's "Prayer for Relief" asks the federal district court, in addition to a declaration that the United States has violated the children's fundamental rights and its public trust obligations, to: (1) "Enjoin the United States from further violation;" (2) "Declare the Energy Policy Act, § 201, to be unconstitutional on its face;" (3) "Declare DOE/FE Order No. 3041, granting long-term multi-contract authorization to Jordan Cove Energy for LNG exports from its Coos Bay terminal, to be unconstitutional as applied and set aside;" (4) Order the United States to "prepare a consumption-based inventory of U.S. CO2 emissions;" (5) Order the United States to "prepare and implement an enforceable national remedial plan to phase out fossil fuel emissions and draw down excess atmospheric CO2 so as to stabilize the climate system and protect the vital resources on which [the children] now and in the future will depend;" (6) "Retain jurisdiction over this action to monitor and enforce [the United States'] compliance with the national remedial plan and all associated orders of this Court;" and (7) "Grant such other and further relief as the Court deems just and proper." (*See* First Amended Complaint for Declaratory and Injunctive Relief at 94–95, Juliana v. United States, 217 F. Supp. 3d 1224 (D. Or. 2016) (No. 6:15-cv-01517-TC) [hereinafter Amended Complaint].

court's holding. Part III examines the court's reasoning for concluding that the children's substantive claims are viable. This chapter concludes that the court applied the correct legal analysis for its holding because (1) the children's Due Process claim adequately alleged a fundamental right sufficient for the court to use its reasoned judgment to declare a climate system capable of sustaining human life as part and parcel to the rights of life, liberty, and property; and (2) the public trust claim was correct because (a) the atmosphere fits squarely within the scope of the public trust assets, (b) the Public Trust Doctrine applies to the federal government, (c) the Public Trust Doctrine has not been displaced by way of congressional acts, and (d) the children maintain a cause of action sufficient to enforce the public trust claim in federal court.

Part IV consists of a reflection that reiterates the noteworthiness of this case and inspects the challenges and opportunities that lie ahead—including an economic examination and an extrapolation of alternative scenarios, with respect to the outcome of a potential trial. Finally, Part V concludes this chapter arguing that because of the failure of the political branches of the federal government to protect public trust assets for rising and future generations, the judicial branch is enabled and should act on safeguarding the children's fundamental right to a viable climate system in the face of human-induced climate change.

See also Appendix A for a critique of the science that informs the case. In representing the best available science concerning actions necessary to avert climate catastrophe, referred to as the Hansen prescription, the science informing the case affirms the scientific consensus, maintaining high confidence, within the climate science field.

II. Case History, Facts, and Holding

Juliana v. United States was originally filed in 2015 during the Obama administration.[246] Subsequently, the major interests of the fossil fuel industry joined

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[246]. Complaint for Declaratory and Injunctive Relief, Juliana v. United States, 217 F. Supp. 3d 1224 (D. Or. 2016) (No. 6:15-cv-01517-TC), 2015 WL 4747094.

defendants as interveners, and the Trump administration took over as defendants.[247] Shortly after the children filed their claims, the United States filed a motion to dismiss under both the political question and constitutional standing doctrines.[248] In addition to deciding the procedural threshold issues, Judge Aiken examined the viability of the children's substantive claims. Judge Aiken issued the opinion and order by way of adopting Magistrate Judge Thomas Coffin's "Findings and Recommendations," which rejected the United States' motion to dismiss and advanced the viability of the children's substantive claims.[249]

Although this chapter focuses on the children's substantive claims (whereas the following chapter, Chapter 4, covers the procedural aspects), it is contextually important to first recognize the basic procedural arguments. Essentially, the United States argued that what the children are asking the courts to do is far beyond the jurisdiction and power of the judicial branch and an encroachment on the power of the executive and legislative branches.[250] The children countered this argument by positing that the judicial branch's role of safeguarding the people from wrongful government action, all while prompting active and responsible action by the executive and legislative branches, is indeed an essential and obligatory role of the courts and thus well within the jurisdiction and power of the judicial branch.[251]

The children's substantive claims challenged "the policies, acts, and omissions of the President of the United States" and his administration.[252] The children's claims focused on the government's historical and present contributions to the development of the fossil fuel industry.[253] The children argued that the federal government has acted with "deliberate indifference" through its "promotion, subsidization, and authorization of the

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247. *Juliana*, 217 F. Supp. 3d at 1233. The fossil fuel industry, as interveners, are comprised of more than 14,000 members of the coal, oil, and natural gas industries, petroleum refiners, and petrochemical manufacturers. Order Granting Motion to Withdraw at 1, Juliana v. United States, 217 F. Supp. 3d 1224 (D. Or. 2016) (No. 6:15-cv-01517-TC).

248. *Juliana*, 217 F. Supp. 3d at 1233.

249. *Id.*

250. *See id.* at 1235.

251. *Id.*

252. *Id.* at 1234.

253. *See* Amended Complaint, *supra* note 8, at 3.

fossil fuel industry."[254] The children maintained that the government's deliberate indifference is directly causing, and will further cause, substantial impairment to the climate system.[255] With that, the children explained that the federal government's subsidy of the fossil fuel industry is the reason why fossil fuel energy is the cheapest and most widely available energy, as opposed to alternative forms.[256] This economic support extended toward the continuance of fossil fuel energy, the children added, is placing a devastating cost on rising and future generations—including the costs of pollution on human health and costs of present and future climate disruption.[257]

Furthermore, the children alleged that the federal government has known for over fifty years about the science that burning fossil fuels was causing global warming and climate change.[258] The children added that the government knew that prolonged emissions were destabilizing the climate system and thus causing increased climate disasters for both present and future generations.[259] Notwithstanding this knowledge, the children contended, the federal government continues to advance emission rates throughout the territories of the United States.[260]

Therefore, the children demanded that, in addition to a declaration of a fundamental right, the atmosphere must be recognized as an essential component of the public trust assets and, thus, must be actively monitored and protected by the federal government.[261] That is, the children claimed that the federal government owes, as a fiduciary, active

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254. *Id.*; "The United States federal and state governments gave away $20.5 billion a year on average in 2015 and 2016 in production subsidies to the oil, gas, and coal industries, including $14.7 billion in federal subsidies and $5.8 billion through state-level incentives." Janet Redman, *Dirty Energy Dominance: Dependent on Denial, How the U.S. Fossil Fuel Industry Depends on Subsidies and Climate Denial*, OIL CHANGE INT'L 5 (Oct. 2017), http://priceofoil.org/content/uploads/2017/10/OCI_US-Fossil-Fuel-Subs-2015-16_Final_Oct2017.pdf.

255. *See* Amended Complaint, *supra* note 8, at 33.

256. *Id.* at 60.

257. *Id.*; *see also* James Hansen et al., *The Case for Young People and Nature: A Path to a Healthy, Natural, Prosperous Future* 22, (Paper has not yet been submitted for publication, http://www.columbia.edu/~jeh1/mailings/2011/20110505_CaseForYoungPeople.pdf) (last visited Mar. 18, 2019).

258. *Juliana*, 217 F. Supp. 3d at 1233.

259. *See* Amended Complaint, *supra* note 8, at 1.

260. *Id.*

261. *See id.* at 94.

maintenance of the atmospheric system to sustain it for present and future generation beneficiaries.[262] Moreover, the children sought a judicial order declaring a fundamental right to children and future generations to a stable and heathy climate system, which the United States must actively address and protect via public trust obligations.[263]

Since the court's decision denying the United States' motion to dismiss was issued on November 10, 2016, a trial date was subsequently scheduled for February 5, 2018.[264] However, in late 2017, the United States filed a petition for a writ of mandamus seeking to bar the children's lawsuit from proceeding to trial.[265] On March 7, 2018, the Ninth Circuit unanimously denied the United States' writ of mandamus, advancing the case to trial on the merits—with plans to commence on October 29, 2018.[266] One week prior to the set trial date, proceedings were stayed pending the Ninth Circuit's decision regarding the government's petition for interlocutory appeal, and, on December 26, 2018, the Ninth Circuit granted the government's petition.[267] Both parties provided oral arguments before the Ninth Circuit panel on June 4, 2019.[268] It took seven months, by January 17, 2020, for the panel to issue a split, two-to-one decision—reversing and remanding the case to the district court with instructions to dismiss for lack of Article III standing for failure to

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262. *See id.* at 81.

263. *Juliana*, 217 F. Supp. 3d at 1249.

264. *See generally Juliana v. United States*, CLIMATE CHANGE LITIG. DATABASES, http://climatecasechart.com/case/juliana-v-united-states/ (last visited Mar. 18, 2019).

265. *Id.* The United States argued that the district court had committed clear error in denying the motion to dismiss and was acting outside its jurisdiction. Oral arguments took place on December 11, 2017, in front of the Ninth Circuit Court of Appeals, and a temporary stay was issued by the Ninth Circuit's three-judge panel.

266. *Id.*, *but see* CLIMATE CHANGE LITIG. DATABASES, *supra* note 1.

267. *See generally Juliana v. United States*, CLIMATE CHANGE LITIG. DATABASES, climatecasechart.com/case/juliana-v-united-states/ (last visited Mar. 20, 2019).

268. On February 7, 2019, the children also filed an preliminary injunction in the Ninth Circuit to enjoin the federal government from authorizing activities through leases, permits, or other federal approvals, such as: mining or extraction of coal on Federal Public Lands; offshore oil and gas exploration, development, or extraction on the Outer Continental Shelf; and the development of new fossil fuel infrastructure, in the absence of a national plan that ensures the above-denoted authorizations are consistent with preventing further danger to the children plaintiffs. *See* Urgent Motion Under Circuit Rule 27-3(b) for Preliminary Injunction, (Feb. 7, 2019), http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/case-documents/2019/20190207_docket-18-36082_motion.pdf.

establish redressability.[269] On February 10, 2021, the Ninth Circuit denied rehearing, and instead scheduled its first settlement conference for June 25th 2021, which is happening procedurally during a process of petition to the Supreme Court for final review.[270]

III. Analysis of the Children's Substantive Claims

The district court applied the correct legal analysis in its holding that both of the children's substantive claims are viable.[271] First, the due process claim is correct because the children adequately alleged, comporting with precedent derived from *Obergefell v. Hodges*, a fundamental right necessary to implicate strict scrutiny review of government action.[272] With that, the court correctly found that the children identified the criteria sufficient to effectuate the danger creation exception, which forbids the government from omitting action because of its causal relationship to the danger.[273] Second, the Public Trust Doctrine claim was correct because the atmosphere is a public trust asset, the Public Trust Doctrine applies to the federal government and has not been displaced, and the children have a cause of action sufficient to enforce the public trust claim in federal court.[274]

A. Due Process Claim

The Due Process Clause of the Fifth and Fourteenth Amendments forbids the government from taking a person's life, liberty, or property without due process of law.[275] Procedural due process examines whether the government has followed proper procedures when taking away someone's life, liberty, or property.[276] Substantive due process examines whether the government has an adequate reason for taking away life,

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269. http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/case-documents/2020/20200117_docket-18-36082_opinion.pdf

270. *Id*.

271. *Juliana*, 217 F. Supp. 3d at 1253.

272. *Id.* at 1249.

273. *Id.* at 1253.

274. *Id.* at 1252–61.

275. The Fifth Amendment states that no person shall "be deprived of life, liberty, or property, without due process of law[.]" U.S. CONST. amend. V. The Fourteenth Amendment states that no state shall "deprive any person of life, liberty, or property, without due process of law[.]" U.S. CONST. amend. XIV.

276. *See* Mathews v. Eldridge, 424 U.S. 319, 332 (1976).

liberty or property.[277] A person cannot have a procedural due process claim unless the government is depriving them of an interest in life, liberty, or property.[278] This means that individuals may only challenge a government action if a recognized interest is involved.

Procedural due process requires a court to have personal jurisdiction over an individual and that the individual be given adequate notice and a fair trial before an unbiased decision-maker.[279] Interests in life, liberty, or property are various and complex. When an individual's life is deprived, procedural due process is implicated.[280] With respect to liberty interests, there are two main types: the freedom from physical constraints and personal security, as well as family autonomy.[281] Family autonomy includes an array of interests related to the raising of children or other family matters.[282] In addition to liberty, the Due Process Clause protects property interests—including traditional property and government benefits or employment.[283]

Substantive due process claims often concern the right to privacy or personal autonomy. If the government takes an action that infringes on a substantive, fundamental right, a reviewing court will apply strict scrutiny.[284] Strict scrutiny demands that the government's action be narrowly tailored to achieve a compelling governmental interest to be held constitutional.[285] Courts applying strict scrutiny show very little deference to legislatures,[286] and legislation subjected to this standard is most frequently struck down.

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277. *See generally* Planned Parenthood of Se. Pa. v. Casey, 505 U.S. 833 (1992).

278. *See Mathews*, 424 U.S. at 332.

279. *See* Mullane v. Cent. Hanover Trust Co., 339 U.S. 306, 314 (1950); *see also* Fuentes v. Shevin, 407 U.S. 67, 80–81 (1972).

280. *See* U.S. CONST. amend. V.

281. *See generally* Youngberg v. Romeo, 457 U.S. 307 (1982); *see also Planned Parenthood of Se Pa*., 505 U.S. at 833.

282. *See* Ingraham v. Wright, 430 U.S. 651 (1977); *see also* Armstrong v. Manzo, 380 U.S. 545 (1965).

283. *See Mathews*, 424 U.S. at 333.

284. *See* Adarand Constructors, Inc. v. Pena, 515 U.S. 200, 237 (1995).

285. *See generally* Romer v. Evans, 517 U.S. 620 (1996).

286. *Id.*

The Ninth Amendment implies that there may be found fundamental rights not specifically enumerated in the Bill of Rights.[287] Specifically, the Ninth Amendment states that "[t]he enumeration in the Constitution, of certain rights, shall not be construed to deny or disparage others retained by the people."[288] The Supreme Court has recognized a variety of unenumerated fundamental rights, consistent with the Ninth Amendment's admonition. For example, parents' decisions concerning the "care, custody, and control" of their own children is declared to be a fundamental right.[289] Privacy in marriage and the right to marry has also been declared to be a fundamental right.[290] More recently, the Supreme Court in *Obergefell* held that same-sex couples also have a fundamental right to marry.[291]

With respect to the *Juliana* case posture, it is important to recognize that at the motion to dismiss stage the factual allegations are assumed to be true and the court simply asks whether, on that assumption, the legal claims are plausible.[292] Thus, having determined that the plaintiffs plausibly claimed a violation of the children's fundamental rights, Judge Aiken's application of strict scrutiny review was the appropriate standard.[293] Therefore, as Judge Aiken correctly articulated, the United States' motion to dismiss hinged on whether the plaintiffs have alleged infringement of a fundamental right.[294] The children's due process claim includes both action and inaction allegations against the federal government. Both issues are analyzed separately below.

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287. The Ninth Amendment was James Madison's attempt to ensure that the Bill of Rights was not seen as granting to the people of the United States only the specific rights it addressed — affirming the existence of unenumerated rights. *See* THE FEDERALIST NO. 84 (Modern Library ed. 1937); *see also* ANNALS OF CONGRESS 439 (1789).

288. U.S. CONST. amend. IX.

289. Troxel v. Granville, 530 U.S. 57 (2000); *see also* Pierce v. Soc'y of the Sisters of the Holy Names of Jesus & Mary, 268 U.S. 510 (1925); Meyer v. Nebraska, 262 U.S. 390 (1923).

290. *See* Zablocki v. Redhail, 434 U.S. 374 (1978) (holding that states cannot prohibit people who owe child support from marrying); Loving v. Virginia, 388 U.S. 1 (1967) (invalidating law banning interracial marriage and recognizing the "freedom to marry" as a fundamental liberty interest for substantial due process purposes); Griswold v. Connecticut, 381 U.S. 479 (1965) (holding that "[r]ights have penumbras, formed by emanations from those guarantees that help give them life and substance" —ultimately leading to the zones-of-privacy framework).

291. Obergefell v. Hodges, 135 S. Ct. 2584, 2598 (2015).

292. Juliana v. United States, 217 F. Supp. 3d 1224, 1235 (D. Or. 2016).

293. *Id.* at 1248; *see also* Witt v. Dep't of Air Force, 527 F.3d 806, 817 (9th Cir. 2008).

294. *Juliana*, 217 F. Supp. 3d at 1249; *see also* Reno v. Flores, 507 U.S. 292, 302 (1993).

1. Due Process: Fundamental Rights and Government Infringement

The Supreme Court cautions federal courts from breaking new ground in the declaration of fundamental rights.[295] The Court acknowledges, however, that fundamental liberty rights may exist in the Constitution, as (1) "deeply rooted in this Nation's history and tradition," or (2) "fundamental to our scheme of ordered liberty."[296] The Court has also stated that this Nation's founders "entrusted to future generations a charter protecting the right of all persons to enjoy liberty as we learn its meaning."[297] With that, Justice Kennedy admonished that in determining whether a right is fundamental, courts must "exercise reasoned judgment."[298] Thus, Judge Aiken addressed the children's due process claims via her "reasoned judgment," in determining whether a climate system capable of sustaining human life is indeed a fundamental right.[299]

Accordingly, Judge Aiken analyzed the children's lawsuit under the *Obergefell* case precedent. She declared that the children's claim to a fundamental liberty right to a "climate system capable of sustaining human life" parallels *Obergefell's* reasoning because "[j]ust as marriage is the 'foundation of the family,' a stable climate system is quite literally the foundation 'of society, without which there would be neither civilization nor progress.'"[300] Additionally, she confirmed that the children's claim that "a stable climate is a necessary condition to exercising other rights to life, liberty, and property" is wholly consistent with *Obergefell's* reasoning.[301]

Essentially, Judge Aiken's reasoning analogized the unenumerated right to marry (tied to the exercise of the right to privacy) with the children's claim of an unenumerated right to a stable climate system (tied to the exercise of the enumerated rights to life, liberty, and property). Judge Aiken correctly emphasized that when the government recognizes a direct link between climate disturbance and the hindrance of its citizen's

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295. *Obergefell*, 135 S. Ct. at 2598.
296. McDonald v. City of Chicago, 561 U.S. 742, 767 (2010) (emphasis omitted from original).
297. *Obergefell*, 135 S. Ct. at 2598.
298. *Id.*
299. *Juliana*, 217 F. Supp. 3d at 1250.
300. *Id.* (quoting *Obergefell*, 135 S. Ct. at 2598).
301. *Juliana*, 217 F. Supp. 3d at 1250.

health and welfare while knowingly approving and promoting the continuance of the forcing agents (fossil fuels), the principal cause of the climate disturbance, the children's alleged right was infringed and thus due process of law must be afforded.[302] Moreover, because the government is affirmatively and substantially damaging the climate system, and thus infringing upon the children's right to liberty, Judge Aiken was correct to confirm that the children have adequately alleged an infringement of a fundamental right sufficient to be afforded due process.

2. Due Process: Government Inaction and the Danger Creation Exception

The inaction component of the United States' dismissal argument is characterized as a danger creation challenge. Essentially, the "danger creation exception" is an exception to the general rule that the Due Process Clause does not impose an affirmative obligation to act on the government.[303] Although this exception is not necessarily needed when, as alleged, the government is actively leasing oil and gas lands, the US military is the largest consumer of fossil fuels in the world, and the government is taking other affirmative actions to further the use of fossil fuels. Nevertheless, as Judge Aiken pointed out, the danger creation exception "permits a substantive due process claim when government conduct 'places a person in peril in deliberate indifference to their safety.'"[304] Such indifference must be the product of a "culpable mental state more than gross negligence."[305] To challenge the government on inaction grounds, the children must show: (1) the government's acts created the danger; (2) the government knew its acts caused that danger; and (3) the government, with "*deliberate indifference*," failed to act to prevent the alleged harm.[306]

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302. *Id.*

303. *Id.* at 1251; L.W. v. Grubbs, 974 F.2d 119, 121 (9th Cir. 1992).

304. *Juliana*, 217 F. Supp. 3d at 1251 (internal punctuation omitted) (quoting Penilla v. City of Huntington Park, 115 F.3d 707, 709 (9th Cir. 1997)).

305. *Id.* (quoting Pauluk v. Savage, 836 F.3d 1117, 1125 (9th Cir. 2016)).

306. *Id.* (emphasis added); *see also Pauluk*, 836 F.3d at 1125; Campbell v. Wash. Dep't of Soc. & Health Servs., 671 F.3d 837, 846 (9th Cir. 2011); Kennedy v. City of Ridgefield, 439 F.3d 1055, 1061 (9th Cir. 2006).

After taking the necessary steps to analyze the plausibility of the danger creation challenge, Judge Aiken concluded that the government's failure to act in limiting third-party CO_2 emissions enables the children to fall under the danger creation exception.[307] If the children could prove their allegations at trial, Judge Aiken affirmed, due process would require government action to reduce emissions under the danger creation exception.[308] That is, the children's allegation that the United States had full knowledge that it was and is a major contributor to the global climate crisis, and was unreasonable in pursuing the risks, is more than plausible to fit within the danger creation exception.

B. Public Trust Claim

The Public Trust Doctrine (PTD) predates the Constitution of the United States, tracing back to sixth-century Rome. Roman Law proclaimed that "the following things are by natural law common to all—the air, running water, the sea, and consequently the seashore."[309] The natural law, codified by civil law, was also incorporated into English common law.[310] In the early 1800s, the PTD was incorporated into United States jurisprudence.[311] A New Jersey Supreme Court case, *Arnold v. Mundy* (1821), was the first case in which the United States addressed the PTD's applicability to natural resources in common law.[312] The *Arnold* court paralleled the ancient Roman Law by articulating that public trust assets "remain common to all the citizens . . . and are called common property . . . [including] the air, the running water, and the sea . . . ."[313]

United States common law took decades to develop the depth and breadth of the PTD as it currently stands. In the late nineteenth century, the Supreme Court in *Stone v.*

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307. *Juliana*, 217 F. Supp. 3d at 1251.

308. *Id.* at 1251–52.

309. *Juliana*, 217 F. Supp. 3d. at 1253 (quoting THE INSTS. OF JUSTINIAN 2.1.1 (J.B. Moyle trans.)).

310. *See* Idaho v. Coeur d'Alene Tribe of Idaho, 521 U.S. 261, 284, (1997); *see also* Joseph L. Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH. L. REV. 471, 475 (1970) (examining public trust doctrine history in the United States).

311. *See Juliana*, 217 F. Supp. 3d at 1253–54.

312. Arnold v. Mundy, 6 N.J.L. 1, 71 (N.J. 1821).

313. *Id*.

Mississippi (1879) made clear that "no part of [the trust] can be granted away."[314] About a decade later, the Court held, in *Illinois Central Railroad Company v. Illinois* (1892), that "[t]he state canno[t] . . . abdicate its trust over property in which the whole people are interested . . . ."[315] Taken out of context, the qualification from *Illinois Central* to this strong statement that suggests there can be no private use of the public trust, but, to be clear, that is not the case—that is, private grants can be made.

Over time, the PTD developed into a persistent common law doctrine in the United States. As it currently stands, the PTD requires the government to hold in trust certain trust assets for the people, including common pool natural resources (such as air and water), which cannot be granted away or be abdicated from its duty.[316] However, the purview of the PTD, especially as applied to the federal government, has not been fully defined by the courts. The extension to the atmosphere is a leap despite the statements that it applies to the air and running water—i.e. that with the exception of the Mono Lake case, US courts have only applied the PTD to the beds and banks of navigable waters. This trust duty, with respect to beds and banks, transferred to states on statehood, which is why these cases involve states rather than the United States.

What the Supreme Court has stated more recently, however, is that the PTD is an inherent sovereign power as an attribute of sovereignty.[317] Justice Kennedy, in *Idaho v. Coeur d'Alene Tribe of Idaho*, declared that the PTD developed as "a natural outgrowth of the perceived public character of submerged lands, a perception which underlies and informs the principle that these lands are tied in a unique way to sovereignty."[318] Moreover, the California Superior Court in the so-called *Mono Lake* case expanded the scope of the PTD beyond the parameters of navigable waters.[319] That is, the *Mono Lake* holding extended the scope to reach non-navigable tributaries that "affect" navigable

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314. Stone v. Mississippi*,* 101 U.S. 814, 820 (1879).
315. Illinois Cent. R.R. Co. v. Illinois*,* 146 U.S. 387, 453 (1892).
316. *Juliana*, 217 F. Supp. 3d at 1253–54.
317. *See* Idaho v. Coeur d'Alene Tribe of Idaho, 521 U.S. 261, 286 (1997).
318. *Id.*
319. *See* Michael C. Blumm & Thea Schwartz, *Mono Lake and the Evolving Public Trust in Western Water*, 37 ARIZ. L. REV. 701, 708 (1995).

waters, including water diversions.[320] *Mono Lake* holds first, that the PTD extends beyond the beds and banks to the water flowing over the beds and banks. The second part was that the new concept that the PTD extends to use of the waters of a public trust resource—that is, it can be applied to water taken from non-navigable streams where it will affect a public trust resource—in this case, Mono Lake.[321] Additionally, the purpose of the PTD is "coincident with changing public needs," and must adapt accordingly.[322] In other words, the PTD "change[s] with the felt necessities of the current generation."[323]

Prior cases address the beds and banks of navigable water ways and was extended to the overlying water in the *Mono Lake* case, but it is still a big leap from there to the atmosphere and that leap relies on dicta from those cases. Judge Aiken broke new ground by holding that the PTD was secured by and enforceable through the Due Process Clause of the Fifth Amendment.[324] At the outset of her PTD analysis, Judge Aiken stressed that it is pivotal to recognize that the PTD dictates that an obligor's fiduciary obligations of the public trust prevent the obligor from depriving future generations of natural resources necessary for their survival.[325] With that, Judge Aiken explained that the obligation of public trust natural resources is implicated where a fiduciary owes a duty to "protect the trust property against damage or destruction."[326] With respect to natural resources, Judge Aiken continued, the government has a fiduciary duty to protect public trust assets from damage "so that current and future trust beneficiaries will be able to enjoy the benefits of the trust."[327]

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320. *Id.*; *see also* Nat'l Audubon Soc'y v. Super. Ct. (*Mono Lake*), 658 P.2d 709, 732 (Cal. 1983) (holding that the public trust doctrine offered independent basis for challenging water diversions).

321 The Mono Lake case applies only in California. Idaho has rejected it by statute. Nevada recently ruled that the PTD does apply to the water itself, but that the state government exercises its public trust duties through its establishment of a water agency and its water use act. Thus only California allows continuing jurisdiction over water allocation to protect a public trust resource.

322. Blumm & Schwartz, *supra* note 80, at 709.

323. *Id*.

324. *Juliana*, 217 F. Supp. 3d at 1260.

325. *Id*.

326. *Id.* at 1254 (citing GEORGE G. BOGERT ET AL., BOGERT'S TRUSTS AND TRUSTEES § 582 (2016)).

327. *Juliana*, 217 F. Supp. 3d. at 1254 (citing MARY C. WOOD, A NATURE'S TRUST: ENVIRONMENTAL LAW FOR A NEW ECOLOGICAL AGE 167 (2014)).

In short, Judge Aiken described that the common law PTD imposes three types of restrictions on the government: (1) the public trust property must be held available for use by the general public; (2) "the property may not be sold;" and (3) the property must be maintained.[328] Judge Aiken explained that the children asserted that the United States violated the first and third restrictions by allowing the depletion and destruction of public trust assets.[329] Therefore, under the first and third prong, Judge Aiken proceeded in her analysis by discussing four challenges put forth by the United States: (1) the scope of public trust assets; (2) the applicability of public trust obligations to the federal government; (3) the displacement of public trust claims by way of congressional acts; and (4) the enforceability of public trust obligations in federal court.[330]

1. Scope of Public Trust Assets

On the one hand, the children alleged that the United States violated its duties as trustee by failing to protect the atmosphere.[331] On the other hand, the United States argued that the atmosphere is not a public trust asset.[332] At this juncture, Judge Aiken found it unnecessary to determine whether the atmosphere is a public trust asset because the children had alleged violations of the PTD in connection with other defined assets within the public trust *res*.[333] Moreover, because some of the children's asserted injuries related to other explicitly defined public trust assets, such as ocean acidification and rising ocean levels and temperatures, Judge Aiken concluded that the children had adequately alleged harm to defined public trust assets.[334]

Judge Aiken was correct in her assessment of finding it unnecessary to categorize the atmosphere as a public trust asset, at that point. However, this aspect is crucial to the children's case moving forward. In a recent case, *Foster v. Washington Department of*

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328. *Juliana*, 217 F. Supp. 3d at 1254; *see also* Sax, *supra* note 71, at 477.
329. *Juliana*, 217 F. Supp. 3d at 1254.
330. *Juliana*, 217 F. Supp. 3d at 1254–55.
331. *Id.* at 1255.
332. *Id.* at 1254–55.
333. *Juliana*, 217 F. Supp. 3d at 1255.
334. *Id.* at 1255–56; *see also* Sax, *supra* note 70, at 556 (explaining that public trust law covers "the low-water mark on the margin of the sea . . . and the waters within rivers and streams of any consequence").

Ecology, the Washington Superior Court stated, speaking of the younger generations, that their "very survival depends upon the will of their elders to act now, decisively and unequivocally, to stem the tide of global warming . . . ."[335] That court went on to emphasize the inextricable relationship between navigable waters and the atmosphere and decided that the separation of the two was "nonsensical."[336] The same logic can be used when analyzing the case at hand. That is, the atmosphere, when viewed in the context of the hydrologic cycle as a whole, reveals an inextricable relationship that places the atmosphere squarely within the scope of public trust assets.

2. Applicability of the Public Trust Doctrine to the Federal Government

The United States contended, mainly citing *PPL Montana, LLC v. Montana*, that the PTD applies only to the states and not to the federal government.[337] Judge Aiken rejected the United States' argument by concluding that, because the public trust is an attribute of sovereignty, the PTD is inherently applicable to the federal government.[338] On its face, *PPL Montana* includes wording that seemingly supports the United States' argument—for example, "the public trust doctrine remains a matter of state law."[339] Judge Aiken correctly concluded, however, that although the language is facially consistent with its argument, the United States contextually misread the sentences derived from that case.[340] *PPL* deals with the beds and banks which have been held to have transferred to states at statehood and, along with it, the duties of trustee. Thus, the question of federal versus state in that case goes to what law prevails. No such transfer to states has ever occurred with the atmosphere. In short, this argument about PPL could have been dealt with much more cleanly. In *PPL Montana*, that court expressly declined to address the viability of

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335. Foster v. Wash. Dep't of Ecology, No. 14-2-25295-1 SEA, 2015 WL 7721362, at 2 (Wash. Super. Ct. 2015).

336. *Id.* at 4.

337. *Juliana*, 217 F. Supp. 3d at 1256.

338. *Id.* at 1257.

339. PPL Montana, LLC v. Montana, 565 U.S. 576, 603 (2012).

340. *Juliana*, 217 F. Supp. 3d at 1256–59.

the federal PTD.[341] Instead, that court examined the imposition of a district court on the federal government after a ruling was made with respect to land being taken pursuant to eminent domain.[342] Thus, the case upon which the United States based its argument concerned a contextually different situation than the case at hand.[343]

Although not directly on-point, Judge Aiken's conclusion that the federal government indeed holds public assets in trust for the people is supported by case law. Judge Aiken examined two federal court cases that have concluded that the PTD applies to the federal government.[344] In one of those cases, the District Court of Massachusetts in *United States v. 1.58 Acres of Land* explicitly held that the federal government is subject to a federal public trust.[345] Additionally, the Ninth Circuit in *United States v. 32.42 Acres of Land* implicated the existence of a federal public trust.[346] Regardless of case precedent, Judge Aiken was correct in concluding that the PTD applies to the federal government because the PTD has a historically unique relationship to sovereignty. Judge Aiken astutely concluded that "[she] can think of no reason why the [PTD], which came to this country through the Roman and English roots of our [legal] system, would apply to the states but not to the federal government."[347]

Again, Judge Aiken would have a much easier time if the children had pointed out that while the Supreme Court has ruled that the beds and banks of navigable water

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341. *PPL Montana, LLC*, 565 U.S. at 603. By legislation, the coastline 3 miles out has been transferred to the coastal states, but outside that to the 200 mile limit remains in the hands of the federal government and it acts as trustee.

342. *Juliana*, 217 F. Supp. 3d at 1257–58.

343. *Id.* at 1257; *see also* United States v. 32.42 Acres of Land, 683 F.3d 1030, 1038 (9th Cir. 2012); *see also* Alec L. *ex rel.* Loorz v. McCarthy, 561 F. App'x 7, 8 (D.C. Cir. 2014).

344. *Juliana*, 217 F. Supp. 3d at 1257–58 (examining both City of Alameda v. Todd Shipyards Corp., 632 F. Supp. 1447 (N.D. Cal. 1986) and United States v. 1.58 Acres of Land, 523 F. Supp. 120, 124 (D. Mass. 1981)).

345. *See 1.58 Acres of Land.*, 523 F. Supp. at 124 (holding that "since the trust impressed upon this property is governmental and administered jointly by the state and federal governments by virtue of their sovereignty, neither sovereign may alienate this land free and clear of the public trust."); *see also City of Alameda*, 635 F. Supp. at 1447 (holding that "if portion of tidelands area acquired by United States by condemnation was subject to action of tides at time of condemnation, then United States acquired portion subject to public trust, and United States could not convey this portion to private party.").

346. *Juliana*, 217 F. Supp. 3d at 1274.

347. *Id.* at 1259.

transferred to the states along with the duty of trustee on statehood, they could have began with the clear statement that it was originally held by the federal government. Knowing that, Judge Aiken could simply say, for example, that no such transfer has occurred with respect to the atmosphere and the ocean between the three mile and 200 mile limit.

3. Non-Displacement of Public Trust Claims

The United States argued, relying on the Supreme Court case, *American Electric Power Company, Inc. v. Connecticut*, that certain acts of Congress (*e.g.*, the Clean Air Act and Clean Water Act) have displaced common law public trust claims.[348] *American Electric* concerned a nuisance claim that could not proceed because, as the Court held, the "Clean Air Act . . . displace[d] any federal common law right to seek abatement."[349] In particular, the United States focused its argument on the language "any federal common law right."[350] Judge Aiken concluded that in *American Electric* the Court did not have public trust claims before it, so it did not consider the differences between public trust claims and other types of claims.[351] Judge Aiken further stated that the public trust claims concern public trusts that "impose[] on the government an obligation to protect the *res* of the trust. . . . [which] cannot be legislated away."[352] Thus, Judge Aiken correctly concluded that a "displacement analysis simply does not apply."[353]

Under a displacement analysis, the Supreme Court noted that legislation may only exclude the declaration of federal common law if "the statute 'speak[s] directly to [the] question at issue."[354] This does not mean that if, for example, the Clean Air Act explained that in addition to addressing local air quality for human health, the purpose of this Act is to address the appropriate level of greenhouse gases, that the federal government would

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348. *Id.*
349. Am. Elec. Power Co. v. Connecticut, 564 U.S. 410, 424 (2011).
350. *Juliana*, 217 F. Supp. 3d. at 1259.
351. *Id.* at 1260.
352. *Id.*
353. *Id.*
354. *Am. Elec. Power Co.*, 564 U.S. at 424 (quoting Mobil Oil Corp. v. Higginbotham, 436 U.S. 618, 625 (1978)).

still not be relieved of any further trustee obligation. Rather, since the PTD presents a constitutional limit on sovereign authority, there can be no displacement even if Congress were to speak directly to the issue at hand.[355] Thus, the *American Electric* inquiry, which looked simply to what the statute addresses, is inappropriate in a constitutional public trust context.

The United States also argued that the Supreme Court, in *Kleppe v. New Mexico*, stated that "'[t]he power over public land entrusted to Congress by the Property Clause of the United States Constitution is 'without limitations[,]' which cannot be reconciled."[356] Judge Aiken explained that the United States again took "the Supreme Court's statement out of context."[357] That is, Judge Aiken clarified:

> The Supreme Court in *Kleppe* simply did not have before it the question of whether the Constitution grants the federal government unlimited authority to do whatever it wants with any parcel of federal land, regardless of whether its actions violate individual constitutional rights or run afoul of public trust obligations.[358]

Therefore, Judge Aiken correctly reiterated, the United States' reading is out of context because the context under review is solely within the parameters of the PTD.[359] Kleppe is based on federal authority under the Property Clause. The federal government does not own a public trust asset outright, but holds it in trust for its citizens. Thus, the duty as fiduciary limits the power over a public trust asset—particularly it prevents destruction of that asset. Whereas, if the federal government wanted to destroy public land by nuclear testing it would only have the political process as its limitation, which is why the PTD is such a powerful doctrine.

4. Enforceability of Public Trust Obligations in Federal Court

The United States' final contention was that the children lack a cause of action to enforce the public trust claim in federal court.[360] Judge Aiken characterized the "defining

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355. *Juliana*, 217 F. Supp. 3d at 1260.
356. *Id.* at 1259 (quoting Kleppe v. New Mexico, 426 U.S. 529, 539 (1976)).
357. *Id.* at 1259.
358. *Id.*
359. *Id.*
360. *Id.* 1260–61.

feature" of the PTD as the duty to protect the entirety of the *res* of the trust, and a duty which "cannot be legislated away."[361] Judge Aiken concluded that "public trust rights both predate[] the Constitution and are secured by it."[362] She also restated that the PTD defines inherent aspects of sovereignty. That is, she explained, citing *Illinois Central*, governments "possess certain powers that permit them to safeguard the rights of the people; these powers are inherent in the authority to govern and cannot be sold or bargained away."[363]

Judge Aiken explained that the children's right of action to enforce the government's obligations as trustee arises, although inherently, from the Constitution through substantive due process claims of the Fifth Amendment.[364] As previously stated, substantive due process "safeguards fundamental rights that are 'implicit in the concept of ordered liberty' or 'deeply rooted in this Nation's history and tradition.'"[365] Judge Aiken concluded that the public trust, since it is not enumerated in the Constitution, is incorporated in substantive due process protection pursuant to the Ninth Amendment.[366] Therefore, since the children adequately alleged PTD ties to constitutional due process claims, Judge Aiken concluded correctly that the children may assert these claims before a federal court.

IV. Reflection and the Challenges and Opportunities that Lie Ahead

The original trial was scheduled on October 29, 2018, and was planned to extend for the following forty-nine days. If the trial continued as planned, the children would have had an incredible task moving forward. During this rather extensive timeframe, the children would have had to prove to the court that the federal government's past and ongoing actions, and inactions, violate the children's constitutional right as articulated by

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361. *Juliana*, 217 F. Supp. 3d at 1260.

362. *Id.*; *see also* Gerald Torres & Nathan Bellinger, *The Public Trust: The Law's DNA*, 4 WAKE FOREST J.L. & POL'Y 281, 288–94 (2014).

363. *Juliana*, 217 F. Supp. 3d at 1261 (citing Illinois Cent. R.R. Co. v. Illinois, 146 U.S. 387, 459–60 (1892)).

364. *Id.*

365. *Id.* (quoting McDonald v. City of Chicago, 561 U.S. 742, 761, 767 (2010)).

366. *Juliana*, 217 F. Supp. 3d at 1261; *see also* Raich v. Gonzales, 500 F.3d 850, 861–66 (9th Cir. 2007).

Judge Aiken—a task that extends far beyond proving to the court the validity of the scientific consensus.[367]

Leading up to the trial, the discovery process would be the most demanding challenge for both parties. Discovery requests issued by the children to the named defendants would have essentially forced the government to respond to past and current denials of the government's contribution to the threat of climate change. Additionally, the fossil-fuel industry, as intervenors, would also have been subject to discovery requests.[368] These requests would have enabled information to be gathered, which has never before been assessed by the judiciary in such a comprehensive way.[369] That is, the fossil fuel industry's internal communications, policies and reports related to climate change, and other materially relevant information in connection with the allegations against the federal government will be available for examination.[370]

For the trial, one of the eighteen expert witnesses, Nobel-winning economist Joseph Stieglitz was set to testify on behalf of the children pursuant to his expert report.[371] In his expert report, Stieglitz explained that not only is it feasible for the United States to move the economy away from fossil fuels, but it is also greatly beneficial.[372] The United States could make this transition, he continued, by utilizing basic economic tools for dealing with externalities—specifically by imposing a tax or levy on carbon and by eliminating

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367. *See* Blumm & Wood, *supra* note 128, at 37–38.

368. *Id*.

369. *Id.*

370. Complying with the children's discovery requests has already turned out to be a difficult task for the fossil fuel industry. Three major trade groups have exited the case, as they were unable to agree on the causes and effects of greenhouse gases. *See generally* Juliana v. United States, COLUM. L. SCH.: SABIN CTR. CLIMATE CHANGE L. (Aug. 29, 2018, 2:31 PM), http://climatecasechart.com/case/juliana-v-united-states/.

371. Joseph Stieglitz, Ph.D., is an economics professor at Columbia University, former World Bank chief economist, and was one of the lead authors of the 1995 Report of the Intergovernmental Panel on Climate Change. Stieglitz was awarded with the Nobel Memorial Prize for economics in 2001 and shared the Nobel Peace Prize in 2007. *See* Expert Report of Joseph E. Stiglitz, Ph.D., Juliana v. United States, 217 F.Supp.3d 1224 (D. Or. June 28, 2018) (No. 6:15-cv-01517-TC), Document 266–1.

372. *Id.* At present, the U.S. lacks a comprehensive carbon-pricing regime that accounts for the negative externalities of burning fossil fuels such that private markets can be relied on to make efficient decisions. *Id.* Thus, producers and sellers of fossil fuels consider only their private costs and benefits, and the costs that their activities are imposing on society through, among other factors, increased GHG emissions and long-term climate effects. *Id.*

subsidies on fossil fuel production.[373] Based on his reasoning, Stieglitz concluded that costs of mitigating climate change now are economically manageable, and if the United States were to make such changes, "the net societal [financial] gain would more than outweigh the net societal [financial] loss."[374] In contrast, he proceeded, if the United States remains on its current course, it will impose unacceptably high costs and risks on rising generations.[375] Stieglitz's expert report, coupled with the many others, will assuredly produce a convincing record before the court, and in turn, enhance the likelihood of a successful outcome for the children.

If the children are successful with their litigation strategy and the constitutional right declaration is upheld, the potential effects on mitigating the environmental degradation of common pool resources would be immense—both as applied and as case precedent.[376] Theoretically, the declared right would enable a judge to order an accounting against the political branches of the federal government.[377] Such accounting would require the government to monitor its pollutant load including, but not limited to, CO_2 emissions and demonstrate to a court that it is conserving public trust resources in accordance with the

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373. *Id*. at 32–40. In January 2018, President Trump approved tariffs on imported solar cells that start at 30%. Julia Pyper, *New Tariffs to Curb US Solar Installations by 11% Through 2022*, GREENTECH MEDIA (Jan. 23, 2018), https://www.greentechmedia.com/articles/read/tariffs-to-curb-solar-installations-by-11-through-2022#gs.hoyAWT4. The tariffs are unlikely to benefit American solar manufacturing jobs, but, according to the Solar Energy Industries Association, are likely to result in the loss of 23,000 American jobs this year and the delay or cancelation of billions in solar investments. *Id.* The tariffs are also expected to lead to a net reduction in solar installations by roughly 11% between 2018 and 2022, a 7.6-gigawatt reduction in solar PV capacity, which means approximately 1.2 million homes will not be powered by renewable solar energy. *Id.* Such tariffs are both harmful for the environment and the economy. *Id.*

374. Stieglitz, *supra* note 238, at 8. These benefits are a result of continued technological development in the renewables sector. *Id.* Because of technological improvements, the costs of renewables and storage are decreasing. The price of solar panels has dropped by more than half in recent years (80% reduction from 2008 to 2016). *Id.* As these technologies continue to improve and the efficiency increases, while manufacturing costs drop, these technologies will more easily substitute for existing fossil fuel infrastructure. *Id.* at 28 (footnotes omitted).

375. *Id*. at 8. There is broad consensus among economists, and the High-Level Commission concluded, that limiting temperature increase to "well below 2 degrees Celsius" is achievable with reasonable and modest measures, and that the costs of those measures are far smaller than the costs of the damage that climate change could inflict. *See* HIGH-LEVEL COMM'N ON CARBON PRICES, REPORT OF THE HIGH-LEVEL COMMISSION ON CARBON PRICES app. A at 52, app. B at 53 (2017).

376. *See* Blumm & Wood, *supra* note 128, at 86.

377. *Id*.

scientifically defined fiduciary obligation.[378] In turn, if the political branches do not uphold their obligation as trustees, there could be injunctions that would subject those officials to contempt of court, unless they halt the activities that are substantially impairing those essential natural resources.[379]

If the declared fundamental right is upheld by the court and the atmosphere is protected as a public trust asset, then direct questions with respect to practical accountability will inevitably arise. The designer of the Atmospheric Trust Litigation theory, Professor Mary Wood at the University of Oregon School of Law, has articulated three future-oriented accountability issues facing the courts: First, the courts must recognize the paramount judicial "role in upholding the rights of the plaintiffs."[380] "Second, the court[s] must issue declarations of principle" that will guide government actors and provide "a framework for the remedy."[381] "Third, the court[s] must manage the remedy so that it offers a practical means to enforce the rights of the plaintiffs."[382]

Alternatively, if the children are unsuccessful, that is—if the declaration of a fundamental right to a viable atmosphere is not upheld—further inquiries extend beyond the workings of the government to the effects on extra-legal areas of society and culture. Scientists are unequivocal in their conclusion that retaining the status-quo for even a few decades would guarantee a massive transition leading to climate impacts that would be out of future generations' control.[383] Without adequate mitigation measures against the federal government now, there is greater demand placed on rising generations to procure the adaptive capacity sufficient to maintain the Earth's climate system as it stands in its current stable state.[384] In turn, rising and future generations are left vulnerable to

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378. *See id.* at 71–72.
379. *Id.* at 64–67, 71–72.
380. *Id.* at 67.
381. *Id.*
382. *See* Blumm & Wood, *supra* note 128, at 67.
383. Hansen et al., *supra* note 20, at 21.
384. *See also* Barbara Cosens, Lance Gunderson & Brian Chaffin, *The Adaptive Water Governance Project: Assessing Law, Resilience and Governance In Regional Socio-Ecological Water Systems Facing a Climate Change*, 51 NAT. RESOURCES & ENVTL. L. ED. IDAHO L. REV.1 (2014). *See generally* Barbara A. Cosens et. al., *The Role of Law in Adaptive Governance*, ECOLOGY & SOC'Y (Mar. 2017), https://www.ecologyandsociety.org/vol22/iss1/art30/.

catastrophic, climate-related impacts.[385] Thus, because of this fact, the fundamental issue presented to the general public centers on the means in which the goal of intergenerational climate justice may be achieved.

V. Conclusion

The scientific consensus has confirmed that human-induced CO_2 emissions have driven the Earth out of energy balance and into the early stages of a runaway greenhouse effect—assuring rising and future generations will face increased warming and climate-related impacts. The political branches of the federal government have failed to respond to these concerns by means other than by clinging to the status-quo—that is, by means other than by deferring action to future generations. For that reason, the children plaintiffs in the preeminent Atmospheric Trust Litigation case, *Juliana v. United States*, have invoked the judiciary to hold the federal government accountable pursuant to constitutional safeguards in conjunction with the Public Trust Doctrine.

A declaration of a fundamental right to a climate system capable of sustaining human life, preserved and protected by the political branches of the federal government via public trust obligations, as articulated by Judge Aiken, is legally viable. It is both feasible and beneficial for the United States to move its economy away from fossil fuel reliance, and the costs of mitigating climate change are now manageable. Regardless of the children's success in future proceedings, the *Juliana* case will reveal to the general public the failure of the federal government to react responsibly to the warnings generated by the scientific consensus—further exposing to society the underlying issue regarding this generations' procurement of intergenerational climate justice.

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385. Hansen et al., *supra* note 20, at 21.

Chapter 4: The Children's Climate Lawsuit (Part 2): A Critique of the Process Before the Ninth Circuit Court of Appeals, Juliana v. United States

In these proceedings, the government accepts as fact that the United States has reached a tipping point crying out for a concerted response—yet presses ahead toward calamity.[...] Seeking to quash this suit, the government bluntly insists that it has the absolute and unreviewable power to destroy the Nation.

—Judge Josephine L. Staton (2020)[386]

I. Introduction

On January 17, 2020, the Ninth Circuit three-judge panel issued its split decision reversing and remanding the *Juliana* case to the district court with instructions to dismiss for lack of Article III standing.[387] The panel majority, Judges Andrew Hurwitz and Mary Murguia, "reluctantly concluded" that, even though the executive and legislative branches "may have abdicated their responsibility" in the face of an impeding "environmental apocalypse," the judicial branch nevertheless lacks the power to redress the children's case.[388] The majority ultimately concluded that the children must bring their climate grievances "to the political branches or to the electorate at large."[389]

The dissenter, Judge Josephine Staton, "vehemently disagreed" with much of the majority's seemingly paradoxical decision.[390] Judge Staton found that the children's claims of "constitutionally cognizable injuries"—which the majority fully recognizes as legally viable—"require[] the court to carry out its constitutionally mandated role to act as a check and balance on the actions of the political branches."[391] Judge Staton concluded that the children's claims are well within the ability of federal courts to redress and, therefore, the children indeed retain standing to present their claims at a trial on the

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386. Juliana v. United States, No. 18-36082, 2020 WL 254149 (9th Cir. 2020). District Court No. 6:15-cv-01517-TC (dissenting opinion)

387. *Id*. can also be found here: http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/case-documents/2020/20200117_docket-18-36082_opinion.pdf.

388. *Id.*

389. *Id*.

390. *Id*

391. *Id*. at 48 n.9 (Staton, J., dissenting).

merits.[392]

On March 2, 2020, the children filed a petition for rehearing *en banc*—requesting that the full-body Ninth Circuit convene to review the split panel decision, vacate the standing decision, affirm the orders of the district court, and remand the case to the district court for trial on the merits.[393] To grant a rehearing *en banc*, a majority of the Ninth Circuit's twenty-nine active judges would have to agree to review the split panel's decision, and then a random collection of eleven judges would convene to rehear the arguments and then issue a new decision.[394] On February 10, 2021, the full-body Ninth Circuit denied the children's request for *en banc* review and upheld the panel majority's decision—without providing explanation or comment.[395]

This chapter examines three main points as to why the *Juliana* case, as it currently stands, remains significant in its efforts toward intergenerational climate justice in the United States: (1) The panel majority issued a ruling that not only comports fully with the scientific consensus informing the case, but also recognizes the validity of the children's claim that the political branches, as trustees of the public trust, are actively violating the children's unenumerated constitutional rights to a viable climate system; (2) The panel unanimously agreed that the children had met the first two prongs of constitutional standing—namely, injury-in-fact and causation. This holding is not only persuasive precedent but also a clarion call for the federal government's deliberations and

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392. *Id*.

393. *See* Petition for Rehearing En Banc of Plaintiffs-Appellees, Juliana v. United States, No. 18-36082 (9th Cir. Mar. 2, 2020).

394. *Id*.

395. On March 9, 2021, the Ninth Circuit denied plaintiffs' motion to amend their complaint against and adjust the remedy sought in their case in response to the Ninth Circuit rulings. Judge Aiken set the date for oral arguments on the youth's Motion to Amend their Complaint. In addition to setting the date for oral arguments, Judge Aiken also ordered the parties to convene for a settlement conference. Just days before settlement talks were scheduled to take place between the youth plaintiffs and Biden Administration, attorneys general from seventeen Republican-led states asked to insert themselves into the case to oppose any proposed settlement. The children still await a last-resort petition to a skeptical United States Supreme Court. The Republican Attorneys General Association (RAGA) (Including: Alabama, Alaska, Arkansas, Georgia, Indiana, Louisiana, Mississippi, Missouri, Montana, Nebraska, North Dakota, Ohio, Oklahoma, South Carolina, Texas, Utah, & West Virginia) are seeking intervention to oppose the children's motion for leave to amend their complaint. RAGA received more than $2.7 million in 2019 and 2020 from fossil fuel companies and their lobbying groups. Our Children's Trust, Press Release, June 8, 2021, https://bit.ly/3iswrXS.

actions moving forward;[396] and (3) The majority's dismissal, based solely on the grounds of redressability, exposes an internal conflict with respect to the interpretation of the separation of powers—that is, whether the Constitution functions so that the judicial branch of government can check and balance the political branches, if their actions fail to protect and preserve unenumerated fundamental rights.

This chapter is organized into five main sections, including this introduction. Section II examines the significance of the panel's unanimous recognition of the validity of the children's claim to an unenumerated constitutional right to a viable climate system. The primary focus here is on the unique way in which the fundamental right was articulated by the court's opinion (i.e., the way in which the Ninth Amendment, the Due Process Clause of the Fifth Amendment, and the Public Trust Doctrine are all connected). Section III inspects the legal significance of the panel's holding that the children's claims meet the injury-in-fact and causation requirements. Section IV analyzes the panel's sole point of divergence and, with that, delves into the underlying meaning of the separation of powers doctrine. Section V concludes this chapter. This chapter concludes that, even though the children are unlikely to be provided with the opportunity to defend and protect the infringement of their unenumerated fundamental rights and public trust assets at trial, the *Juliana* opinion, in its current case posture, is impactful in its efforts to help shape public conversation and drive political action toward the overarching goal of intergenerational climate justice.[397]

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396. *See* Juliana v. United States, No. 18-36082, slip op. at 18–21 (9th Cir. Jan. 7, 2020).

397. An array of briefs filed with the Ninth Circuit Court in support of the plaintiffs, urging the Ninth Circuit to grant the en banc petition, including: Twenty-four members of the U.S. Congress; a team at Harvard Medical School and Harvard Law School; Professional organizations, including—the American Academy of Pediatrics, the American Heart Association, and the American Lung Association—as well as seventy-two department chairs, physicians, nurses and other public health experts; various environmental history professors, dozens of international lawyers; and several leading women, children, environmental, and human rights organizations; along with 32,340 youth leaders representing all 50 states. The federal government also has supporters, including: The National Federation of Independent Business; Western States Trucking Association; Merit Oil Co. and Liberty Packing Co.; and represented by lawyers from the Texas Public Policy Foundation. Together, the briefs dismiss the argument that the federal government should be held accountable as "trustees of public trust resources" that transcend state borders, including the air, atmosphere, oceans, wildlife and federal public lands.

II. The Significance of the Panel's Recognition of the Validity of the Children's Claim to an Unenumerated Fundamental Right

The United States Constitution confines the jurisdiction of federal courts to the resolution of "Cases" or "Controversies."[398] Article III § 2 states that "[t]he judicial Power shall extend to all Cases, in Law and Equity, arising under this Constitution, the Laws of the United States, and Treaties made [. . . .] to Controversies to which the United States shall be a Party [. . .]."[399] In other words, federal courts only have constitutional authority to resolve actual disputes deemed "Cases" or "Controversies".[400]

The Supreme Court has developed a three-part test to determine whether a party has standing to sue in this context: (1) The plaintiffs must have suffered an "injury-in-fact", meaning that the injury is of a legally protected interest which is (a) concrete and particularized and (b) actual or imminent; (2) There must be a causal connection between the injury and the conduct; and (3) It must be likely, rather than speculative, that a favorable decision will redress the injury.[401]

Before the panel could find that the children had actually or imminently experienced a concrete and particularized injury-in-fact, they first had to acknowledge that a legally protected interest was at stake.[402] Typically, at this conceptual juncture, judges and justices tend to diverge on their approaches to the law. That is, they often disagree as to whether the Founders intended the Constitution as a static document bound

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398. U.S. Const. art. III.

399. U.S. Const. art. III, § 2.

400. *See id*.

401. *See* Lujan v. Defenders of Wildlife (90-1424), 504 U.S. 555 (1992); *see also* Friends of the Earth, Inc. v. Laidlaw Envtl. Servs. (TOC), Inc., 528 U.S. 167, 180–81 (2000).

402. By applying the three-part test, the panel majority held the following: First, […T]he district court correctly found that plaintiffs claimed concrete and particularized injuries. Second, […] the district court properly found the Article III causation requirement satisfied for purposes of summary judgment because there was at least a genuine factual dispute as to whether a host of federal policies were a 'substantial factor' in causing the plaintiffs' injuries. Third, […] plaintiffs' claimed injuries were not redressable by an Article III court. Specifically, […] it was beyond the power of an Article III court to order, design, supervise, or implement the plaintiffs' requested remedial plan where any effective plan would necessarily require a host of complex policy decisions entrusted to the wisdom and discretion of the executive and legislative branches.

by the literal meaning of its text, or whether those words represent concepts of liberty to be interpreted over time.[403]

In the case at hand, however, the panel did not disagree as to this point. Rather, they unanimously agreed with the district court that, although unenumerated in the Constitution (i.e., not explicitly stated therein), the children have adequately presented, at least to this point, a justiciable claim of a constitutional rights violation.[404] The implication was that the Founders could not have envisioned that human-induced CO_2 emissions would destabilize the climate system and threaten the children's prosperity in that way, but, nevertheless, they understood the Founders to have drafted the Constitution to allow for fundamental rights to be interpreted over time as they become apparent to society.

The panel contemplated the string of connections made within the children's fundamental rights claim. "The government has violated [the children's] constitutional rights, including a claimed right under the Due Process Clause of the Fifth Amendment to a "climate system capable of sustaining human life."[405] The majority further explained that "[t]he complaint asserts violations of: […] rights under the Ninth Amendment; […] substantive rights under the Due Process Clause of the Fifth Amendment; and […] the public trust doctrine." The significance here is that the panel unanimously recognized the validity of the children's claim of an unenumerated fundamental rights violation—as is explicitly approved under the Ninth Amendment, protected pursuant to the Due Process Clause of the Fifth Amendment, and bolstered in conjunction with the public trust

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[403]. There are also hybrid approaches such as John Hart Ely's "political process theory", where he contended that these inherently dichotomous approaches are incomplete and inadequate. In short, Ely explains how strict construction fails to do justice to the open texture of many of the Constitution's provisions and that the notion that judges may infer broad moral rights and values from the Constitution is simply undemocratic. *See generally* John Hart Ely, *Democracy and Distrust* (1980); *see also* Justice Stone's Footnote Four from *United States v. Carolene Products Co.* (1938) is a chief inspiration for Ely's theory of judicial review."

[404]. *See id*.

[405]. *id*.

doctrine.[406] The following subsections detail why the panel's decision is so consequential as persuasive precedent.

1. Unenumerated Fundamental Rights and the Ninth Amendment

The Ninth Amendment states that "[t]he enumeration in the Constitution, of certain rights, shall not be construed to deny or disparage others retained by the people."[407] In 1787, the Framers almost uniformly adopted John Locke's philosophy that human laws must conform to nature's laws for the preservation of humankind.[408] When the proposed Constitution was submitted to the states for ratification, the document was strongly opposed by the Anti-Federalist Party.[409] One of their main objections was that the Constitution did not specifically include a list of rights granted to the people.[410] The Federalist Party argued that it would be practically impossible to list all conceivable rights, and that an incomplete list would be troublesome for future generations because the government would then have the power to limit or even deny any non-listed rights.[411] In an attempt to resolve this debate, the Virginia Ratifying Convention proposed a compromise in the form of a constitutional amendment (i.e., the Ninth Amendment)

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406. The majority explained that "[t]here is much to recommend the adoption of a comprehensive scheme to decrease fossil fuel emissions and combat climate change, both as a policy matter in general and a matter of national survival in particular."

407. U.S. CONST. amend. IX.

408. *Id*. at 46 (*citing* John Locke, Second Treatise, Of Civil Government ¶ 136, n.3 (*quoting* Hooker's Ecclesiastical Polity, III, 9 ("human laws must be made according to the general laws of Nature . . . otherwise they are ill made"))). For example, the Declaration of Independence explicitly recognized unalienable rights, like "Life, Liberty and the pursuit of Happiness," which are natural rights—meaning that they are rights that are not bestowed by the laws of people. *Id*. (*citing* Declaration of Independence para. 2 (U.S. 1776)). In turn, the very concept of fundamental rights, which by their very nature are those in which everyone may claim an interest, qualify as fundamental because they can be asserted by all citizens. *Id*. (*explaining* that "Thomas Jefferson wrote about the fundamental premise, that natural law was unalienable— Thomas Jefferson to John W. Eppes, June 24, 1813, The Writings of Thomas Jefferson vol. XIII, 272 (A.E. Bergh 1907); *see* James Madison, Property, Mar. 29, 1792, The Writings of James Madison vol. VI, 101 (Gaillard Hunt ed. 1906) (*stating* the importance of leaving a "like advantage" to others for their own preservation).

409. *id.*

410. Library of Virginia, *Virginia Ratifying Convention*, http://edu.lva.virginia.gov/online_classroom/shaping_the_constitution/doc/ratifying (last visited Apr. 25, 2019). *See also* Cornell Law School, *U.S. Constitution: Ninth Amendment*, https://www.law.cornell.edu/constitution/ninth_amendment (last visited Apr. 25, 2019).

411. *id*.

which explicitly requires that other unenumerated fundamental rights may be recognized over time.[412]

Throughout the years, federal courts have interpreted the Ninth Amendment as confirming the existence of such unenumerated rights outside those expressly protected by the Bill of Rights.[413] In effect, the Ninth Amendment enables the "Case" and "Controversy" method to identify the unenumerated rights as they are presented to the court, and the court is obliged to examine the claimed right in context and exercise its reasoned judgment in identifying interests that are so fundamental that the government must accord its respect.[414] Accordingly, in the *Juliana* case, the district court, unlike at any time prior in history, identified an unenumerated fundamental right to "a climate system capable of sustaining human life".[415] The panel's decision is significant, as to this point, because it unanimously accepted the validity of the children's claim as permissible under the Ninth Amendment of the Constitution.[416]

2. Protection of Fundamental Rights Pursuant to the Due Process Clause of the Fifth Amendment

The Supreme Court has specified that the judicial approach to the "identification and protection of fundamental rights is an enduring part of the judicial duty to interpret the Constitution."[417] That responsibility, however, "has not been reduced to any formula."[418] The Supreme Court has provided guidance in looking to whether the asserted right is either "'fundamental to the Nation's scheme of ordered liberty' . . . or . . . 'deeply

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412. *Id*.

413. *Id*.

414. Scholars explain that "the draftsmen of the Constitution invariably took the view that their generation had an obligation to protect the well-being of future generations." *See* Jim Gardner, *Discrimination Against Future Generations: The Possibility of Constitutional Limitation*, 9 Envtl. L. 29, 35 (1978)").

415. *See id*.

416. Although, not providing stand-alone protection. *See Id*. at 43.

417. Poe v. Ullman, 367 U. S. 497, 542 (1961).

418. *Id.* (Harlan, J., dissenting from denial of certiorari).

rooted in this Nation's history and tradition.'"[419] In doing so, courts must "exercise reasoned judgment in identifying interests of the person so fundamental that the State must accord them its respect."[420] This approach allows "future generations [to] protect . . . the right of all persons to enjoy liberty as we learn its meaning."[421]

The *Juliana* district court found that "[t]here is no rational argument to conclude that our climate system, the foundation on which all of our human systems and institutions have been built, is not fundamental to people's lives, liberties, and property."[422] Judge Aiken declared, "I have no doubt that the right to a climate system capable of sustaining human life is fundamental to a free and ordered society."[423] The panel majority's decision is significant here not only because it again recognized the validity of the district court's declaration of an unenumerated climate right, but also because it held that such a right is fundamental because it underpins other substantive due process rights already recognized as protected under the Fifth Amendment of the Constitution.[424]

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[419]. *See* Answer Brief at 41-42; *see also* McDonald v. City of Chicago, 561 U.S. 742, 744 (2010) (*quoting* Glucksberg, 521 U.S. at 721); *see also* Obergefell, 135 S.Ct. at 2598 (finding no specific formula for identifying fundamental rights).

[420]. *Id*. (quoting Poe, 367 U.S. at 542 (Harlan, J., dissenting)).

[421]. *Id*. Over the years, Supreme Court jurisprudence has recognized many unenumerated fundamental rights pursuant to the Due Process Clause as those that are "essential to ordered liberty." *See* McDonald v. City of Chicago, 561 U.S. 742, 744 (2010); *see also Obergefell v. Hodges*, 135 S.Ct. 2584, 2598-99 (2015) (applying "reasoned judgment" to identify fundamental personal interests). "Previously recognized unenumerated liberty interests include the rights to direct the education and upbringing of one's children (Pierce v. Soc'y of Sisters, 268 U.S. 510, 534-35 (1925); Meyer v. Nebraska, 262 U.S. 390, 400 (1923)), procreation (Skinner v. Oklahoma ex rel. Williamson, 316 U.S. 535 (1942)), bodily integrity (Rochin v. California, 342 U.S. 165, 172-73 (1952)), contraception (Griswold v. Connecticut, 381 U.S. 479, 485-86 (1965)), abortion (Planned Parenthood of Southeastern Pa. v. Casey, 505 U.S. 833 (1992); Roe v. Wade, 410 U.S. 113, 153 (1973)), sexual intimacy (Lawrence v. Texas, 539 U.S. 558, 578 (2003)), family (Moore v. City of East Cleveland, 431 U.S. 494 (1977)), and marriage (Loving v. Virginia, 388 cU.S. 1, 12 (1967)). *See also* McDonald v City of Chicago, 561 U.S. 742 (2010) (finding the second amendment's protection of firearms for the purpose of protecting one's home and family to be deeply rooted in this Nation's history and traditions such that it is encompassed in the 14th Amendment's protection of liberty)." Answer Brief at 41-42.

[422]. *Juliana*, 217 F. Supp. 3d. at 1234 at 50.

[423]. *Id.* "[A] stable climate system is quite literally the foundation 'of society, without which there would be neither civilization nor progress.'"*Id*. (quoting Obergefell, 135 S.Ct. at 2598).

[424]. The climate right is one "underlying and supporting other vital liberties." Answer Brief at 41 (*citing* Washington v. Glucksberg, 521 U.S. 702, 728 (1997)).

3. Public Trust Doctrine and its Deeply Rooted History and Traditions

The panel majority also held that the district court had properly found the children's fundamental climate right as "deeply rooted in our Nation's history and traditions".[425] In 1788, James Madison wrote in the Federalist Papers that "the federal and State governments are in fact but different agents and trustees of the people."[426] On multiple occasions, the Founders referenced public trust as both an inherent aspect of sovereignty and as a special covenant between generations.[427] The Supreme Court solidified the law as to this point in its 1892 *Illinois Cent. R.R.* case. The Court declared that the government "possess certain powers that permit them to safeguard the rights of the people; these powers are inherent in the authority to govern and 'cannot be sold or bargained away.'"[428]

The *Juliana* district court found that the public trust doctrine has long been recognized as an attribute of sovereignty and is an inalienable element of the Constitution that "cannot be legislated away."[429] The panel unanimously accepted the validity of the

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425. *See id.*; *see also* Joseph L. Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH.L.REV. 471 (1970); Joseph L. Sax, *Liberating the Public Trust Doctrine from Its Historical Shackles*, 14 U.C. DAVIS L. REV. 185 (1980); Mary Christina Wood, *Advancing the Sovereign Trust of Government to Safeguard the Environment for Present and Future Generations (Part I): Ecological Realism and the Need for a Paradigm Shift*, 39 ENV'TL. 43 (2009); Mary Christina Wood, *Advancing the Sovereign Trust of Government to Safeguard the Environment for Present and Future Generations (Part II): Instilling a Fiduciary Obligation in Governance*, 39 ENV'T L. 91 (2009). Joseph Sax declared in *Liberating the Public Trust Doctrine from Its Historical Shackles* that "[o]f all the concepts known to American law, only the public trust doctrine seems to have the breadth and substantive content which might make it useful as a tool of general application for citizens seeking to develop a comprehensive legal approach to resource management problems."

426. James Madison, The Federalist Papers : No. 46, January 29, 1788, http://avalon.law.yale.edu/18th_century/fed46.asp.

427. Amici curiae brief of members of the United States Congress filed in support of plaintiffs-appellees, 5 (Mar. 1, 2019), http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/case-documents/2019/20190301_docket-18-36082_amicus-brief-3.pdf.

428. *Juliana*, 217 F. Supp. 3d at 1261 (citing Illinois Cent. R.R. Co. v. Illinois, 146 U.S. 387, 459-60 (1892)). In short, Supreme Court precedent "lodges the public trust in the reserved powers that citizens hold against their government; in other words, citizens give government power, not the reverse."Congress Members Brief at 7 (*citing* Ill. Cent. R.R. v. Illinois, 146. U.S. 387, 455 (1892).

429. *See* Amicus brief filed by Center for International Environmental Law and Environmental Law Alliance Worldwide—US in support of plaintiffs-appellees, (Mar. 1, 2019), http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/case-documents/2019/20190301_docket-18-36082_amicus-brief-9.pdf (*citing* Ill. Cent. R.R. v. Illinois, 146. U.S. 387, 455 (1892).

children's public trust claim. The panel majority found the government's knowing failure to act responsibly to the climate crisis as a violation of its fiduciary obligations.[430] Moreover, the panel's unanimous recognition of the validity of the children's claim to a fundamental right that is preserved and protected by the federal government pursuant to public trust obligations is persuasive precedent for similarly situated climate cases.

III. The Significance of the Panels' Acceptance of the First two Prongs of Constitutional Standing

A. The Children are Deemed Suffering Injury-in-Fact

The twenty-one youth plaintiffs each alleged a concrete and particularized injury-in-fact. For example: Kelsie Juliana, the namesake of the *Juliana* case, alleged harms associated with increased wildfires and poor air quality at her home in the Pacific Northwest; one plaintiff, from Rayne, Louisiana, lost her home to hurricanes and floods; the youngest plaintiff was forced to evacuate his coastal home in Florida because of rising sea levels; one plaintiff claimed that she was forced to leave her home because of water scarcity, separating her from relatives on the Navajo Reservation; yet another, from Fairbanks, Alaska, faced increased winter rains and severe ice storms—causing his city on multiple occasions to declare a state of disaster.[431]

The panel majority found the children to have successfully demonstrated concrete and particularized injuries of a legally protected interest. "The record leaves little basis for denying that climate change is occurring at an increasingly rapid pace[,]" the majority starkly noted, and "atmospheric CO_2 levels have skyrocketed to levels not seen for almost 3 million years." This "unprecedented rise", the majority warned, "will wreak havoc on the Earth's climate if unchecked", thus "[t]here is much to recommend the adoption of a comprehensive scheme to decrease fossil fuel emissions and combat climate change, both as a policy matter in general and a matter of national survival in particular."[432] The panel

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[430]. *Juliana*, 217 F. Supp. 3d. at 1234.

[431]. *See generally*, Our Children's Trust, *Meet the Youth Plaintiffs*, https://www.ourchildrenstrust.org/federal-plaintiffs (last visited Dec. 11, 2019).

[432]. Panel decision at 18. The Majority explained that "failure to change existing policy may hasten an environmental apocalypse."

majority's opinion is remarkable with respect to the degree of recognition regarding the federal government's active "pushing [of] the nation toward collapse" and how children and future generations stand to suffer the worst of the consequences.

B. The Political Branches are Deemed the Cause of the Harm

The panel majority found that the children's concrete and particularized injuries-in-fact are sufficiently traceable to the government's facilitation of fossil fuel use and development.[433] The majority emphasized how the "copious expert evidence [...] leaves little basis for denying" the children's claims.[434] "[T]he plaintiffs' alleged injuries are caused by carbon emissions from fossil fuel production, extraction, and transportation[,]" and, as the majority aptly pinpointed, "a significant portion of those emissions occur in this country; the United States accounted for over 25% of worldwide emissions from 1850 to 2012, and currently accounts for about 15%."[435]

The panel majority detailed the government's actions with regards to their role in prioritizing and authorizing fossil fuel use over alternative forms of energy. "The government affirmatively promotes fossil fuel use in a host of ways" the majority detailed, "including beneficial tax provisions, permits for imports and exports, subsidies for domestic and overseas projects, and leases for fuel extraction on federal lands."[436] The majority also found that "[a]bout 25% of fossil fuels extracted in the United States come from federal waters and lands, an activity that requires authorization from the federal government."[437] To make matters worse, the majority noted ominously, the federal government is "expanding oil and gas extraction four times faster than that of any other nation", and, to top it all off, such growth "shows no signs of abating."[438] The panel majority's detailed articulation of the federal government as the cause of the children's actual and imminent injuries is the significant aspect here.

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433. *See id*

434. *Id*

435. *See Massachusetts*, 549 U.S. at 524–25 (*finding* that emissions amounting to about 6% of the worldwide total showed cause of alleged injury "by any standard").

436. *Id.*

437. *Id*.

438. *Id.*

IV. Point of Divergence: How to Interpret Article III Redressability and the Separation of Powers Doctrine

The panel majority found the "more difficult question" of constitutional standing to be "whether the plaintiffs' claimed injuries are redressable by an Article III court."[439] Redressability requires the plaintiffs to show that the relief they seek is both (1) substantially likely to redress their injuries and (2) within the district court's power to award.[440] The subsections below briefly detail the panel's conflicting interpretations, and the final subsection argues that the dissenting opinion was the correct decision. The Supreme Court should step in to protect the ability of federal courts to interpret the Constitution and to resolve this controversy through a clear declaration of law to protect the children's fundamental rights.

A. The Panel Majority's Opinion

The panel majority was "skeptical" that the children had even satisfied the first prong of redressability. The majority struggled with the fact that the children's own experts did not, at that point, explain exactly how enjoining the government's activities would "suffice to *stop* catastrophic climate change or even ameliorate [the children's] injuries."[441] The majority found that doing so is asking too much of the political branches, because "the global consequences of climate change […] calls for no less than a fundamental transformation of this country's energy system, if not that of the industrialized world."[442] The problem is, the majority found, that "any effective plan would necessarily require a host of complex policy decisions entrusted, for better or worse, to the wisdom and discretion of the executive and legislative branches."[443]

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439. *See id*. at 11, 25.

440. *Id*. at 21 (Lujan v. Defenders of Wildlife (90-1424), 504 U.S. 555 (1992).

441. *Id*. (emphasis added).

442. *Id*.

443. *Id*. "These decisions range, for example, from determining how much to invest in public transit to how quickly to transition to renewable energy, and plainly require consideration of competing social, political, and economic forces, which must be made by the People's elected representatives, rather than by federal judges interpreting the basic charter of Government for the entire country." *See* Collins v. City of Harker Heights, 503 U.S. 115,128–29 (1992).

The panel majority nevertheless went on to assume that the first redressability prong was satisfied. The majority's dismissal was based on the second prong of redressability—that is, whether the federal courts retain the power to redress this case. The majority narrowed the question to whether it is beyond the power of an Article III court to "order, design, supervise, or implement the children's requested remedial plan."[444] The majority affirmed that this question "implicate[s] the separation of powers."[445] Without acknowledging controlling or persuasive precedent as to this separation of powers question, the majority found the constitutional system to outright preclude this type of judicial remedy, and, as the majority concluded, the children's case "must be presented to the political branches of government."[446]

B. The Panel Dissent's Opinion

With respect to precedent, the dissent found parallel instances of federal court intervention when the political branches had similarly violated fundamental rights. In *Brown v. Board of Education*, for example, where the Supreme Court unanimously ruled that segregation was illegal and called for schools to be desegregated with "deliberate speed", Judge Staton found compelling precedent in that the justices in that case had intended their decision to protect the fundamental rights of all children (in that case, a fundamental right to public education) and then required the courts to supervise the remedial action designed by the political branches (in that case, by school authorities).[447] Similarly, in *Brown v. Plata*—a 2011 case about overcrowding in the California prison system—the Supreme Court found that the prisoners' Eighth amendment rights were violated by the state's crowded prisons (which were at 181% of their capacity at the time of the trial). Judge Staton found the Court's ruling—that the prisons had to reduce their population capacity back to constitutional compliance, even at a very specific threshold

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444. The panel's majority dismissal was in part reliant upon conflating the separation of powers doctrine with political question doctrine reasoning.

445. *Id.*

446. *Id*.

447. *See* Brown *v.* Board of Education of Topeka (1); https://www.loc.gov/exhibits/brown/brown-aftermath.html.

of 137.5% capacity—to fit squarely with the Juliana case.[448] Judge Staton concluded that "it is hard to believe that [the *Juliana* district court] cannot be equally creative in using its equitable powers to fashion a helpful—though admittedly imperfect—remedy that protects [the children's] constitutional rights to a meaningful extent."[449]

Aside from case precedent, Judge Staton also found the panel majority's decision legally incorrect because it "promotes separation of powers to the detriment of our countervailing constitutional mandate to intervene where the political branches run afoul of our foundational principles."[450] The majority's decision is "wrong as a matter of law and an abdication of the solemn duty the courts have in our democracy." Judge Staton explained that the "tripartite system of government is often and aptly described as one of checks and balances[,]" a duty which "compels federal courts to fashion and effectuate relief to right legal wrongs, even when—as frequently happens—it requires that [the courts] instruct the other branches as to the constitutional limitations on their power."[451] Furthermore, Judge Staton concluded that the children's "constitutionally cognizable injuries […] call[s] for the Courts to set the trajectory of the political branches to a constitutionally permissible path of climate redress."[452]

C. Analysis: Why the Dissent Applied the Correct Legal Analysis

The panel dissent correctly found that the federal courts are within their power to limit the political branches, without violating other aspects of the separation of powers doctrine.[453] The dissent aptly pointed to the structure of the tripartite system of government as deliberately providing avenues for the operation of checks on the exercise of governmental power.[454] The Founders understood the purpose of this design as the

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448. *See Brown v. Plata, 563 U.S. 493.*

449. *See* Panel dissent's opinion.

450. *Id.*

451. Sometimes "the [judicial and governance] roles briefly and partially coincide when a court, in granting relief against actual harm that has been suffered, . . . orders the alteration of an institutional organization or procedure that causes the harm." *Lewis*, 518 U.S. at 350; *cf. Valley Forge Christian Coll. v. Ams. United for Separation of Church & State, Inc.*, 454 U.S. 464, 474 (1982)

452. *See id*.

453. *See* e.g., Brown v. Bd. of. Educ., 349 U.S. 294 (1955); Brown v. Plata, 563 U.S. 493 (2011); Hills v. Gautreaux, 425 U.S. 284 (1976).

454. Bowsher v. Synar at 722.

prevention of the accumulation of power in the hands of one decision-making body to the detriment of society.[455] "By their mutual relations", Madison explicitly explained, the independent branches must "be the means of keeping each other in their proper places."[456] Supreme Court Chief Justice John Marshall later famously determined that "it is emphatically the province and duty of the judicial department to say what the law is[,]" and that duty has ever since been interpreted as an indispensable feature of the constitutional system.[457]

Accordingly, with regards to the *Juliana* case—where the government not only failed to protect the children's fundamental rights but also actively infringed upon those same rights—the panel dissent correctly interpreted the separation of power doctrine as requiring the judicial branch to act as a check and balance upon the political branches to protect the children's fundamental rights.[458] The panel majority was wrong not only because its decision narrowed the judicial branches role to act as a check on the unlawful exercise of governmental power, but also because its decision led to the abdication the judicial branch's obligation to protect and preserve the children's fundamental rights.

V. Conclusion

The Ninth Circuit three-judge panel's *Juliana* decision unanimously found that the children's declared, unenumerated, and constitutionally cognizable fundamental rights and public trust assets have been systematically violated by the political branches of the federal government. The decision affords valuable insights into how and why the United

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455. James Madison, The Federalist Papers : No. 48, February 1, 1788, http://avalon.law.yale.edu/18th_century/fed48.asp.

456. James Madison, The Federalist Papers : No. 51, February 8, 1788, "The separation of powers ensures dependence on, and accountability to, the people: It may be a reflection on human nature, that such devices should be necessary to control the abuses of government. But what is government itself, but the greatest of all reflections on human nature? If men were angels, no government would be necessary. If angels were to govern men, neither external nor internal controls on government would be necessary. In framing a government which is to be administered by men over men, the great difficulty lies in this: you must first enable the government to control the governed; and in the next place oblige it to control itself." http://avalon.law.yale.edu/18th_century/fed48.asp.

457. *See* Cooper v Aaron, 358 U.S. 1, 18 (1958) (*citing* Marbury, 5 U.S. at 177))."

458. *See* Marbury, 5 U.S. at 170 ("The province of the court is, solely, to decide on the rights of individuals, not to enquire how the executive, or executive officers, perform duties in which they have a discretion.")).

States sovereign government was designed by the Framers with natural law with the ability to recognize unalienable rights that are unenumerated in the Constitution, yet secured by it. As argued by the dissent, the federal judiciary has both the duty to interpret the law in this instance and has the power to redress the *Juliana* case to protect the children from the government's infringement of their public trusts and fundamental rights. An order from the court, which the federal government could come to via trial or an agreement through a court-supported mediation and settlement, could bring about the science-based solution sufficient to resolve the United States role in causing the climate crisis all while protecting the interests of rising and future generations. Even without trial or a successful settlement, the *Juliana* opinion will leave a lasting legacy toward the overarching goal of intergenerational climate justice.

Aside from the strategic climate change litigation that defines the *Juliana* case, there is a barrage of routine climate change litigation constantly challenging the federal government's failure to curb its ongoing energy system policies and practices that are known to disproportionately endanger and harm rising and future generations. The following chapter analyzes one such routine climate change litigation case, *WildEarth Guardians v. BLM*, which concerns the federal government's coal leasing business on public lands. With that, this chapter examines how the public trust doctrine is also a legal principle that underlies modern environmental statutory law—including and especially NEPA—which has incorporated the public trust doctrine into its terms.[459] Moreover, NEPA urges policymakers to view environmental responsibility through the lens of serving as trustees for rising and future generations, and the following chapter exposes some of the federal government's pitfalls that entail in achieving successful NEPA compliance in this context.

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[459]. *See* 42 U.S.C. § 4331(b) (1970).

Chapter 5: Taking a Hard(er) Look: *WildEarth Guardians v. BLM* and the Federal Government's Failure to Use the Best Available Science to Analyze its Coal Leasing Impacts Imposed on Rising and Future Generations

[I]t is the continuing responsibility of the Federal Government to use all practicable means […] to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may […] fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.

—NEPA § 101(b)[460]

[P]olicy goals announced in […] NEPA are thus realized through a set of action forcing procedures that require agencies to take a hard look at environmental consequences.

—Justice Stevens, excerpt from Robertson case[461]

I. Introduction

The Powder River Basin (PRB) is a geologic region that extends from the Bighorn Mountains to the Black Hills on the Montana-Wyoming border. (*See Figure* 5.1) The PRB is the largest coal-producing region in the United States, constituting over eighty percent of the total federal coal production.[462] This coal production generates approximately one-fifth of the electricity in the United States and is responsible for nearly fifteen percent of its total CO_2 emissions.[463] Over 1.8 billion tons of mineable coal reserves are found within Campbell County, Wyoming, alone.[464] Within this same county, and near the city of Wright, Wyoming, is located a series of coal tracts known as the Wright Area.[465] The Wright Area coal tracts are situated on public land, and the BLM is the federal agency responsible for issuing mineral

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460. National Environmental Policy Act of 1969 § 101(b), 42 U.S.C. § 4331(b) (1970).

461. Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 19 (1989) at 350.

462. Wyoming Mining Association, *Coal Production and Employment*, (2018) https://www.wyomingmining.org/minerals/coal/coal-production-employment/ (last visited Dec. 16, 2019).

463. *See* WildEarth Guardians, *Powder River Basin: Epicenter of the U.S. Climate Fight*, https://wildearthguardians.org/climate-energy/maps/powder-river-basin-epicenter-climate/ (last visited Dec. 16, 2019).

464. Wyoming Mining Association, *Coal Production and Employment*, (2018) https://www.wyomingmining.org/minerals/coal/coal-production-employment/ (last visited Dec. 16, 2019).

465. *See* George Coggins et. al., *Federal Public Land and Resources Law, Seventh Edition* (Foundation Press, 2014), http://www.law.indiana.edu/publicland/ (lat visited Dec. 13, 2019) (*stating* that a 2018 report of the U.S. Geological Survey found that an average of 24% of American greenhouse gas emissions came from energy produced on public lands).

leases upon this land.[466] *WildEarth Guardians v. BLM* arose from a legal challenge to the BLM's decision to issue coal leases within the Wright Area.[467]

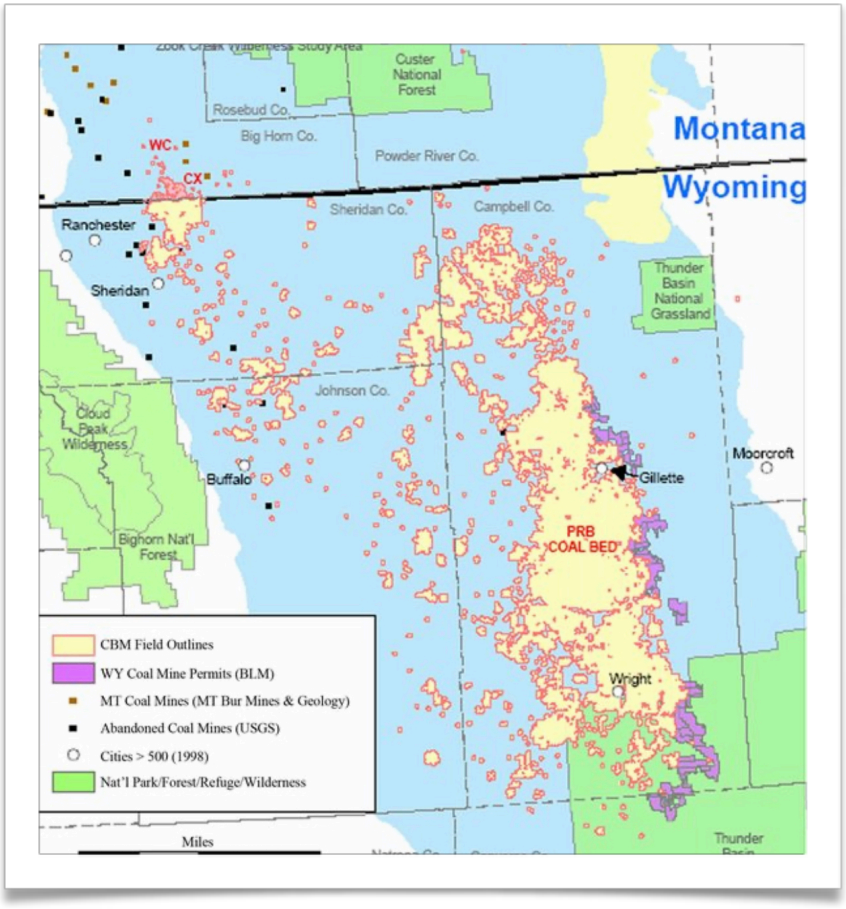

Figure 5.1 A map showing the extent of the PRB coal bed.

Agencies act to fill in the gaps legislation, and they are ostensibly the experts in the field and have discretion in many ways. This chapter analyzes the *WildEarth* case and details how and why, even recognizing this discretion, the BLM and the federal courts not only failed to comport with the underlying goals of NEPA but also failed to uphold statutory public trust demands that lie at the heart of intergenerational climate justice.[468] This chapter

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[466]. The BLM issues leases pursuant to the Federal Land Policy and Management Act (FLPMA), the Mineral Leasing Act (MLA), and BLM's own regulations and plans. *See* 43 C.F.R. §§ 1601.0–1610.8 and 43 C.F.R. §§ 3400.0–3–3487.1.

[467]. WildEarth Guardians v. U.S. Bureau of Land Management, 870 F.3d 1226 (10th Cir. 2017).

[468]. 40 C.F.R. § 1502.22(a).

is organized into five Parts, including this introduction. Section II provides the legal context of NEPA. Section III provides the facts, challenges, and holding of the *WildEarth* case. Section IV provides the legal analysis and details why readily available, quality climate science is essential information required under NEPA. Section V concludes this chapter by explaining that, beyond its legal obligations under NEPA, the federal government falls outside its ethical and legal decision-space when its actions are based on decisions that ignore reliance on the best available, quality climate science and devalue the projected climate impacts of its actions on rising and future generations.

II. Legal Context (NEPA)

NEPA is a sweeping federal law that uses an interdisciplinary approach to ensure environmental concerns are integrated into planning and decision making.[469] NEPA provides the legal framework for federal agencies to evaluate the climate impacts of, among other actions, leasing coal on public lands.[470] NEPA is a procedural statute, based on trust responsibilities for the benefit of succeeding generations, with two main goals: (1) informed decision making and (2) informed public participation.[471] With respect to proposed actions that significantly[472] affect the environment, all federal agencies are required to produce an Environmental Impact Statement (EIS)—where agencies must "present the environmental impacts of the proposal and the alternatives in comparative form [and] sharply defin[e] the

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[469]. NEPA § 102

[470]. *See id*. The operative language—102(2)—Requires all agencies of the federal government to "include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official" on the environmental impact of the proposed action and alternatives to the proposed action.

[471]. *See* 42 U.S.C. § 4332(C); *see also Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989).

[472]. Assess whether the environmental effects of proposal/ federal action deemed significant look to whether there is (1) a categorical exclusion; (2) if uncertain, develop and Environmental Assessment (EA), if the EA concludes not significant issue a Finding of no Significant Impact (FONSI), if EA concludes significant, file notice to prepare an Environmental Impact Statement—public scoping, draft EIS—public review and comment, Final EIS—available to the public—record of decision in Federal Resister; How to determine "major" and "significant": determine context (e.g., National Park) and intensity (e.g. natural gas proposal along a fault line). To determine the scope of the EIS agencies must consider three types of actions ((1) connected actions, (2) cumulative actions, (3) similar actions), alternatives ((1) no action alternative, (2) other reasonable course of action, (3) mitigation measures) , and impacts (1) direct, (2) indirect, (3) cumulative).

issues and provid[e] a clear basis for choice among options by the decision-maker and the public."[473]

The alternatives analysis is often expressed as the heart of the EIS.[474] Agencies must "rigorously explore and objectively evaluate" these alternatives "so that reviewers may evaluate their comparative merits."[475] Courts characterize NEPA's procedural requirement as obliging agencies to take a "hard look" at the environmental consequences and alternatives.[476] The Council on Environmental Quality (CEQ) oversees NEPA implementation, principally through issuing guidance and interpreting regulations that implement NEPA's requirements.[477] The CEQ regulates the scientific standards that the agency is obliged to abide by, and the agency is required to ensure that the scientific integrity of the NEPA analysis is met.[478]

NEPA does not provide a private right of action, so judicial review claims are brought under the Administrative Procedure Act (APA).[479] Under the APA, an agency's decision is unlawful if its actions, findings, or conclusions are arbitrary and capricious.[480] This deferential standard focuses on the agency's decision-making process.[481] While an agency

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[473]. *Robertson*, 490 U.S. at 349.

[474]. *See WildEarth*, 870 F.3d at 1226; *see also* 40 U.S.C. § 1502.14.

[475]. *See WildEarth*, 870 F.3d at 1227. This is done because without "substantive, comparative environmental impact information regarding other possible courses of action, the ability of an EIS to inform agency deliberation and facilitate public involvement would be greatly degraded." (*citing* New Mexico ex rel. Richardson v. BLM, 565 F.3d 683, 708 (10th Cir. 2009)).

[476]. *See WildEarth*, 870 F.3d at 1227 (*citing Robertson*, 490 U.S. at 350, *Richardson*, 565 F.3d at 704, and Biodiversity Conservation All. v. U.S. Forest Serv., 765 F.3d 1264, 1267 (10th Cir. 2014)).

[477]. *See* NEPA.Gov, *The Council on Environmental Quality*, https://ceq.doe.gov/index.html (last visited Dec. 13, 2019). CEQ REGULATIONS1500.2 (b) Environmental impact statements shall be concise, clear, and to the point, and shall be supported by evidence that agencies have made the necessary environmental analyses.

[478]. *See WildEarth*, 870 F.3d at 1227; *see also* 40 C.F.R. §§ 1500.1–1508.28 (2012); *see also* 42 U.S.C. §§ 4342 & 4344.

[479]. *See WildEarth*, 870 F.3d at 1227; *see also* 5 U.S.C. §§ 701–706. The APA also governs the way in which federal administrative agencies may propose and establish regulations.

[480]. *See WildEarth*, 870 F.3d at 1233. A decision is arbitrary and capricious if it: "(1) fails to consider an important aspect of the problem; (2) contradicts the evidence before the agency or is so implausible that it cannot be attributed to a difference of opinion; (3) is not based upon consideration of the relevant factors; or (4) is a clear error in judgment." *See Id*.

[481]. *See WildEarth*, 870 F.3d at 1233.

may select a more environmentally harmful alternative, its reasons for doing so must be rational and disclosed.[482]

III. Facts, Challenges, and Holdings

In 2009, the BLM prepared a Draft Environmental Impact Statement (DEIS) for four Wright Area coal leases.[483] Subsequently, WildEarth Guardians, an environmental non-profit organization, submitted public comments detailing the reasons why the BLM's assessment lacked sufficient scientific support and contained an inadequate conclusion.[484] The BLM responded by explaining that the leases would not have "any effect on the price for coal or demand for it."[485] In support of its response, the BLM stated that the Energy Information Administration's (EIA) Annual Energy Outlook reports indicated that population and energy demand are predicted to rise, and that coal is predicted to remain as the largest fuel in the energy mix.[486] The BLM concluded that, because of these reasons, "demand for coal will remain static regardless of the potential reduction in supply."[487] Accordingly, the BLM stated that "limiting one or even several points of fuel supply would not affect coal use because of the diverse group of national and international coal suppliers."[488]

In 2010, the BLM published its Final Environmental Impact Statement (FEIS).[489] The FEIS concluded that there was "no appreciable difference" between the preferred alternative and the no action alternative.[490] The BLM again reasoned that, even if the leases were not approved, "the same amount of coal would be sourced from elsewhere and ultimately emit the same amount of carbon dioxide."[491] The BLM again relied on the EIA's reports and

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482. *Id*.

483. *Id*.

484. *Id*.

485. *Id*.

486. *Id*.

487. *Id.* at 1228. The BLM also acknowledged that burning coal is a major source of climate-harming greenhouse gases, that climate change is a significant problem, and that moving toward cleaner energy sources "not reliant on carbon fuels" and "[r]educing human-caused GHG emissions" would be a positive step that "would help to lessen any harmful effects […]." *See* App. 1057.

488. *WildEarth*, 870 F.3d at 1228.

489. *Id.*

490. *Id*.

491. *Id.*

assumed that because "all forms of electric generation would grow at a proportional rate", and that the United States' overall demand for coal was predicted to increase, the "effect on the supply of coal of the no action alternative would have no consequential impact on demand."[492]

The BLM subsequently issued a Record of Decision (ROD) and offered the four coal tracts for lease.[493] The ROD further emphasized the BLM's conclusion that "many other mines have the capacity to replace the coal production generated by the tracts offered for lease."[494] The ROD also explained that the replacement coal does not have an effect on the market because "not offering these leases would not cause electric generators to stop burning coal."[495] Incidentally, the BLM received a record-setting $1.5 billion in bonus bids for three of its four Wright Area lease tracts.[496]

In 2012, WildEarth brought an APA challenge against the BLM and alleged that it had failed to adequately compare the alternatives for the four RODs and the FEISs in federal district court, in three consolidated cases.[497] Following consolidation, The District Court for the District of Wyoming ultimately rejected WildEarth's substantive arguments and upheld the BLM's actions as reasonable.[498] WildEarth subsequently appealed to the Tenth Circuit.

The central issue on appeal was whether the BLM had acted arbitrarily and capriciously in assuming that the issuance of the leases would have no impact on the total amount of coal mined and burned in the United States, and thus have no impact on the total

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[492]. *Id*. Specifically, the FEIS explained that "[i]t is not likely that selection of the No Action alternative [ ] would result in a decrease of US CO_2 emission attributable to coal mining and coal – burning power plants in the longer term because there are multiple other sources of coal, that, while not having the cost, environmental, or safety advantage, could supply the demand for coal beyond the time that the Black Thunder . . . and North Antelope Rochelle mines complete recovery of the coal in their existing leases." *See* George Coggins et. al., *Federal Public Land and Resources Law, Seventh Edition* (Foundation Press, 2014), http://www.law.indiana.edu/publicland/ (last visited Dec. 13, 2019).

[493]. *WildEarth*, 870 F.3d at 1229. Since the BLM's decision, North and South Porcupine and South Highlight were leased; North Highlight's lease had not yet been sold.

[494]. *WildEarth*, 870 F.3d at 1229.

[495]. *Id*.

[496]. *See* George Coggins et. al., *Federal Public Land and Resources Law, Seventh Edition* (Foundation Press, 2014), http://www.law.indiana.edu/publicland/ (last visited Dec. 13, 2019).

[497]. *WildEarth*, 870 F.3d at 1230.

[498]. *WildEarth*, 870 F.3d at 1230.

amount of CO_2 emitted from the United States' electricity generating sector.[499] The Tenth Circuit found that the BLM's assumption was not supported by evidence in the administrative record and found that the assumption "[fell] below the required level of data necessary to reasonably bolster the choice of alternatives."[500] For that reason, the Tenth Circuit held that the BLM was arbitrary and capricious in its decisionmaking.[501]

The case was remanded to district court with instructions to enter an order requiring the BLM to revise its EIS and RODs.[502] But, with respect to the BLM's obligations to determine the projected climate impacts on rising and future generations, the Tenth Circuit found that the BLM's lack of using any readily available climate modeling tools to base its decision is deemed reasonable because, the court reasoned, NEPA does not require courts to mandate a particular source to guide agency decisionmaking.[503]

On March 6, 2018, the BLM simply published a revised Environmental Assessment (EA) in response to the remand.[504] The revised EA again disregarded the best available science and held that the BLM can rationally conclude that increasing federal supply of coal will not affect the use and demand by lowering cost, and that there is no difference in the total contribution of the United States' CO_2 emissions regardless of whether the leases are issued or not.[505] The BLM's EA is now presumptively lawful by the Tenth Circuit's standards because it at least gave some mention to some reports, regardless of scientific quality (or date

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499. *See* Petitioners-Appellants' Opening Brief

500. *WildEarth*, 870 F.3d at 1234 (*noting* that the BLM provided no citation indicating that the coal deficit under the "No Action" alternative (some 320 million tons per year) could be filled from elsewhere or at a comparable price).

501. *WildEarth*, 870 F.3d at 1236.

502. *Id*. at 1240.

503. *Id*.

504. *See* George Coggins et. al., *Federal Public Land and Resources Law, Seventh Edition* (Foundation Press, 2014), http://www.law.indiana.edu/publicland/ (lat visited Dec. 13, 2019).

505. *Id*.; The EA reiterates the BLM's perfect substitution argument. It explained that the PRB coal leasing is a circumstance where the agency can rationally conclude that increasing federal supply of coal will not affect use/demand by lowering cost. The EA concludes by stating: "The Wright Area EIS concluded that the selection of the No Action Alternative of not offering the leases would not likely result in a decrease of nationwide CO_2 emissions since there were multiple other sources of coal, which we have further illuminated in this EA." *See* George Coggins et. al., *Federal Public Land and Resources Law, Seventh Edition* (Foundation Press, 2014), http://www.law.indiana.edu/publicland/ (lat visited Dec. 13, 2018).

of publication), as being the basis of its rationale in support of its decision to proceed in issuing the leases.

IV. Legal Analysis: Why Reliance on the Best Available Climate Science is Essential Information Required Under NEPA and Critical to the Demands of Intergenerational Climate Justice

The Tenth Circuit supported its holding by concluding that NEPA does not require agencies to adopt any particular internal decision-making structure.[506] The Tenth Circuit concluded that choosing not to adopt a quality climate modeling technique did not render the BLM's EIS arbitrary and capricious, but, rather, its irrational and unsupported substitution assumption did.[507] The Tenth Circuit applied an erroneous analysis in support of its holding that the BLM was not arbitrary and capricious for ignoring readily available modeling tools to measure the climate impact because dismissing these tools results in the BLM's failure to acquire the information essential to make a reasoned choice among alternatives and, in turn, violates the underlying goals of NEPA.[508]

WildEarth was not asking the court to require the BLM to use one particular modeling tool, but, rather, it was merely highlighting the arbitrary and capricious nature of the BLM's failure to use any climate modeling tool at all.[509] Although WildEarth indicated a particular available modeling tool that the BLM might have used, namely the National Energy Modeling System (NEMS), nowhere did it argue that this was the only credible source that the BLM was required to adopt.[510]

In an Eighth Circuit case, *New Mexico ex rel. Richardson*, the BLM was found to have violated NEPA by glossing over critical climate and market impacts without adequately analyzing and disclosing those impacts in a climate and market analysis modeling study.[511] The Eighth Circuit explained that those climate and market impacts are "reasonably foreseeable given the massive amount of coal at stake, and understanding climate impacts is

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506. *See generally WildEarth*, 870 F.3d 1222.
507. *Id*.
508. 40 C.F.R. § 1502.22(a).
509. *Id*.
510. *See WildEarth*, 870 F.3d at 1239.
511. *Id*. (*citing Richardson*, 472 F.3d at 555).

central to evaluating the tradeoffs between approving or rejecting one of the largest proposals for coal mining in the history of the federal coal leasing program."[512] The Eighth Circuit further explained that "NEPA does not permit an agency to remain oblivious to differing environmental impacts, or hide these from the public."[513] Here, the Eight Circuit case provides compelling reasons detailing why the BLM's approval of the coal leases must include a similar hard look—with the use of quality modeling tools—at the impact of coal and climate impacts on rising and future generations.

Understanding the climate impacts of a decision for what are among the largest coal leases in history is, indeed, "essential to making a reasoned choice among alternatives."[514] Congress has explicitly stated that "[i]f the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives," and if the information is accessible and not obtained at an exorbitant cost, "the agency *shall* include the information in the [EIS]."[515] The BLM did not use any available climate modeling tool to provide the essential information, nor did it explain why it chose not to do so.[516] Because the BLM offered no reasoned explanation for why it refused to employ climate modeling tools to assess the effects of its decision, no agency deference may be afforded.[517]

Pursuant to NEPA, the BLM is obliged to prepare a thorough study of climate impacts and to explain in detail how the various alternatives considered would affect overall demand for coal and other energy resources.[518] The BLM violated NEPA because it failed to take a hard look, informed by quality science, to provide a clear basis for a choice among options by the decision-maker and the public as to how alternatives differed in the quantity of coal, CO_2, and climate impacts.[519] Where climate impacts are central to making a reasoned choice

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512. *WildEarth*, 870 F.3d at 1239.
513. *Id*. (*citing Richardson*, 565 F.3d at 707).
514. *WildEarth*, 870 F.3d at 1239.
515. 40 C.F.R. § 1502.22 (a) & (b) (*emphasis added*).
516. *See* Petitioners-Appellants' Opening Brief.
517. *Id*.
518. *Id*.
519. *Id*.

among alternatives, knowing the relative amount of CO_2 emissions among two alternatives is indeed crucial information.[520] Thus, the BLM was required to use the tools available to it—which may or may not include the NEMS—to adequately analyze, using the best available science, and disclose to the public the impacts of the federal government's actions on rising and future generations.[521]

In turn, the Tenth Circuit failed to hold the BLM's scientific integrity accountable when it allowed the BLM to neglect a thorough evaluation of the reasonably foreseeable climate impacts of issuing the four coal leases.[522] The two goals of informed decision-making and informed public participation provide the basic framework for which the CEQ promulgates its regulatory standards. This ensures that federal agencies uphold the scientific integrity requirement for accurate analysis and high quality information. By failing to hold the BLM accountable, the Tenth Circuit failed to protect the public and decision-makers alike from adequately receiving the information necessary to compare between alternatives and to make a reasoned choice, all to the detriment of rising and future generations.[523]

V. Conclusion

In its *WildEarth Guardians v. BLM* opinion, the Tenth Circuit's holding was erroneous because dismissing such reliance on quality climate science unequivocally resulted in the BLM's failure to acquire and disclose the information that is essential to make a reasoned choice among alternatives, which is both unlawful under NEPA and contrary to its explicit and implicit trust responsibilities. Taking a hard look means using the best available science to analyze climate consequences and to base its decision-making on feasible and reasonable alternatives. In accordance with intergenerational climate justice, federal agencies must be held accountable in conducting meaningful review of proposed actions with projected climate impacts and must be informed by quality climate science to ensure a reasoned choice among the decision-makers and the public as to how the action will impact

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[520]. *Id*.

[521]. *Id*.

[522]. *See generally* Murray Feldman & Kristin Nichols, *NEPA's Scientific and Information Standards—Taking a Harder Look*, 62017 No. 5 RMMLF-Institute (2017).

[523]. *Id*.

rising and future generations who will be ones forced to live with the impending consequences.

Although NEPA allows an agency to choose the action that would result in the worse-case scenario analysis, it does require that a worst-case scenario is thoroughly analyzed (using the best available science) and transparently presented to the public. This chapter points to NEPA's pitfalls when it comes to federal agency discretion—which, among other shortcomings, includes pre-decisional and conclusory statements, unsubstantiated conclusions, superficial data and detail; and, as displayed in the *WildEarth Guardians* case, ignoring or downplaying the significant aggregate climate impacts imposed on rising and future generations. In the *WildEarth Guardians* case, the individual decision contributes to the cumulative impacts that will go undetected and unaccounted for. The critical question is whether this is a singular occurrence or a common trend among multiple federal agencies taking various similar actions. The following chapter provides a mixed methods, comparative analysis to answer this question.

Chapter 6: Exposing a Pattern of Failures: Comparative Analysis of 113 NEPA Climate Change Litigation Complaints, 2015-2019

I. Introduction

Litigation around climate change is a rapidly rising trend in the United States and around the world (*see* Figure 6.1).[524] More than three-quarters of all climate change litigation identified globally has been filed in the United States, and approximately eighty percent of those cases were brought against the federal government.[525] The most common type of climate change litigation brought against the federal government are challenges brought under principles of law pursuant to NEPA.[526] As the previous chapter detailed, NEPA provides the legal framework for federal agencies to research and disclose to the public proposed actions that significantly affect the environment.[527] Federal agencies are required to take a "hard look" at the "direct" and reasonably foreseeable "indirect" and "cumulative" consequences of their proposed actions.[528] As the scientific understanding regarding the climate impacts of individual projects, policies, and laws continues to advance, claimants rely more on federal courts to review the actions in relation to this scientific understanding to both enhance informed decision making and to curb the projected harms and burdens imposed on rising and future generations.[529]

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[524]. Setzer J and Byrnes R (2020) *Global trends in climate change litigation: 2020 snapshot*. London: Grantham Research Institute on Climate Change and the Environment and Centre for Climate Change Economics and Policy, London School of Economics and Political Science.

[525]. *Id*.

[526]. *See id; See also* Sabin Center for Climate Change Law, *U.S. Climate Change Litigation*, http://climatecasechart.com/us-climate-change-litigation/ (last visited Jan. 20, 2020).

[527]. *See* § 1508.7. At least those parts that are part of federal projects.

[528]. Agencies must consider "cumulative impacts," which are defined as impacts resulting "from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. CEQ, Considering Cumulative Effects under the National Environmental Policy Act, at 41 (1997), available at http://energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/G-CEQ-ConsidCumulEffects.pdf (*clarifying* that agencies must define an appropriate threshold against which to compare projected environmental impacts, and this threshold should incorporate future environmental conditions).

[529]. Michael B. Gerrard, *Reverse Environmental Impact Analysis: Effect of Climate Change on Projects*, 247(45) N.Y.L.J. 1 (Mar. 8, 2012).

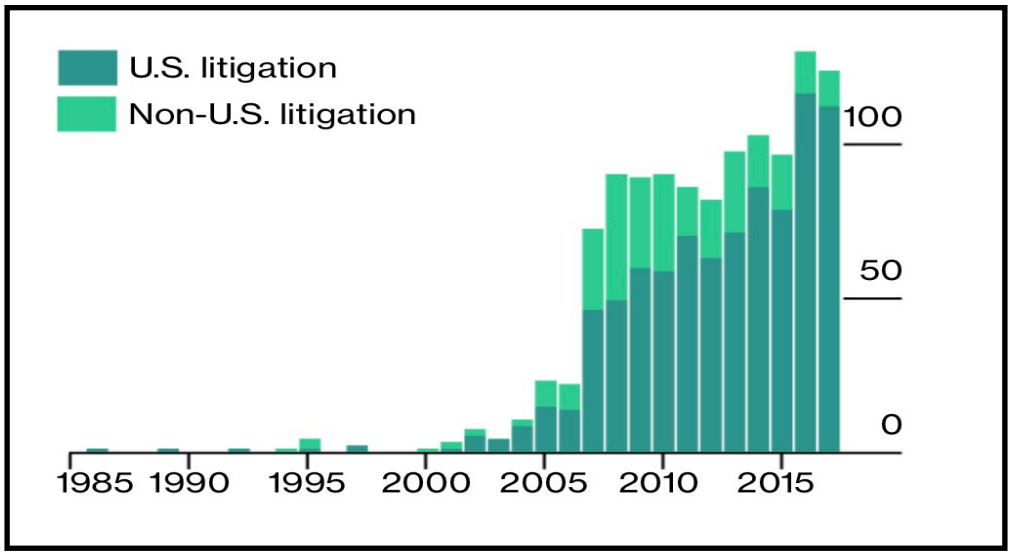

Figure 6:1. Graph depicting the number of climate change lawsuits by year.[530]

To gain a greater understanding of this emerging and evident trend of routine climate change litigation, and to underpin the policy and legal issues demanding closer attention, this chapter applies a mixed methods comparative analysis to all climate change NEPA complaints filed from the beginning of 2015 to the end of 2019.[531] With that, this chapter is divided into five parts, including this introduction. Part II details the comparative analysis design and explains why the 113 NEPA complaints found within this timeframe are such significant units of observation. Part III supplies the relevant data that emerged from the 113 NEPA complaints, which is displayed via a series of simple tables and graphs that identifies the consistent themes and interconnections found therein. Part IV provides an interpretation of the results and discusses the significance of the findings. Part V concludes this chapter and encourages further research, stemming from this initial comparative analysis.

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[530]. Jeremy Hodges, Lauren Leatherby & Kartikay Mehrota, *Climate Change Warriors' Latest Weapon of Choice is Litigation*, BLOOMBERG (May 24, 2018), https://www.bloomberg.com/graphics/2018-climate-change-lawsuits/.

[531]. *See id.*; *see also* Randall Abate, *Climate Justice: Case Studies in Global and Regional Governance Challenges* (2016), Environmental Law Institute, Washington, D.C, http://commons.law.famu.edu/faculty-books/24.

II. Comparative Analysis Design

The Sabin Center for Climate Change Law at Columbia Law School maintains an extensive database encapsulating all climate change litigation filed within the United States. Of the 1083 climate change cases filed from the beginning of 1990 to the end of 2019, 631 were filed in federal courts. 521 of the 631 federal lawsuits are categorized as federal statutory claims. A large number of the 521 federal statutory claims, or 198 of them (which is by far the single largest chunk), were brought under principles of law pursuant to NEPA. And, of those 198 cases, just over half—or 113, were filed from the beginning of 2015 to the end of 2019. Because they represent the most frequent and common type of climate change litigation filed in the United States, these 113 NEPA complaints warrant special attention with respect to a mixed methods comparative analysis.[532]

The 113 NEPA complaints began as the initial units of observation. From there, a frequency count was applied to the complaints using a computer textual software program, called Voyant Tool, which identified the most common words and phrases within the complaints.[533] The words and phrases with the highest frequency count were then filtered to display only those words and phrases that indicated allegations of a NEPA violation or cause of action (that is, only those words and phrases that provided explanations as to why the government actions were either arbitrary and capricious, an abuse of discretion, or otherwise contrary to law). These words and phrases were then compiled into a table, coupled with pertinent context, and then comparatively analyzed to identify the commonalities that emerged from the data (*see* Appendix B). The table and graphs displayed in Part III below

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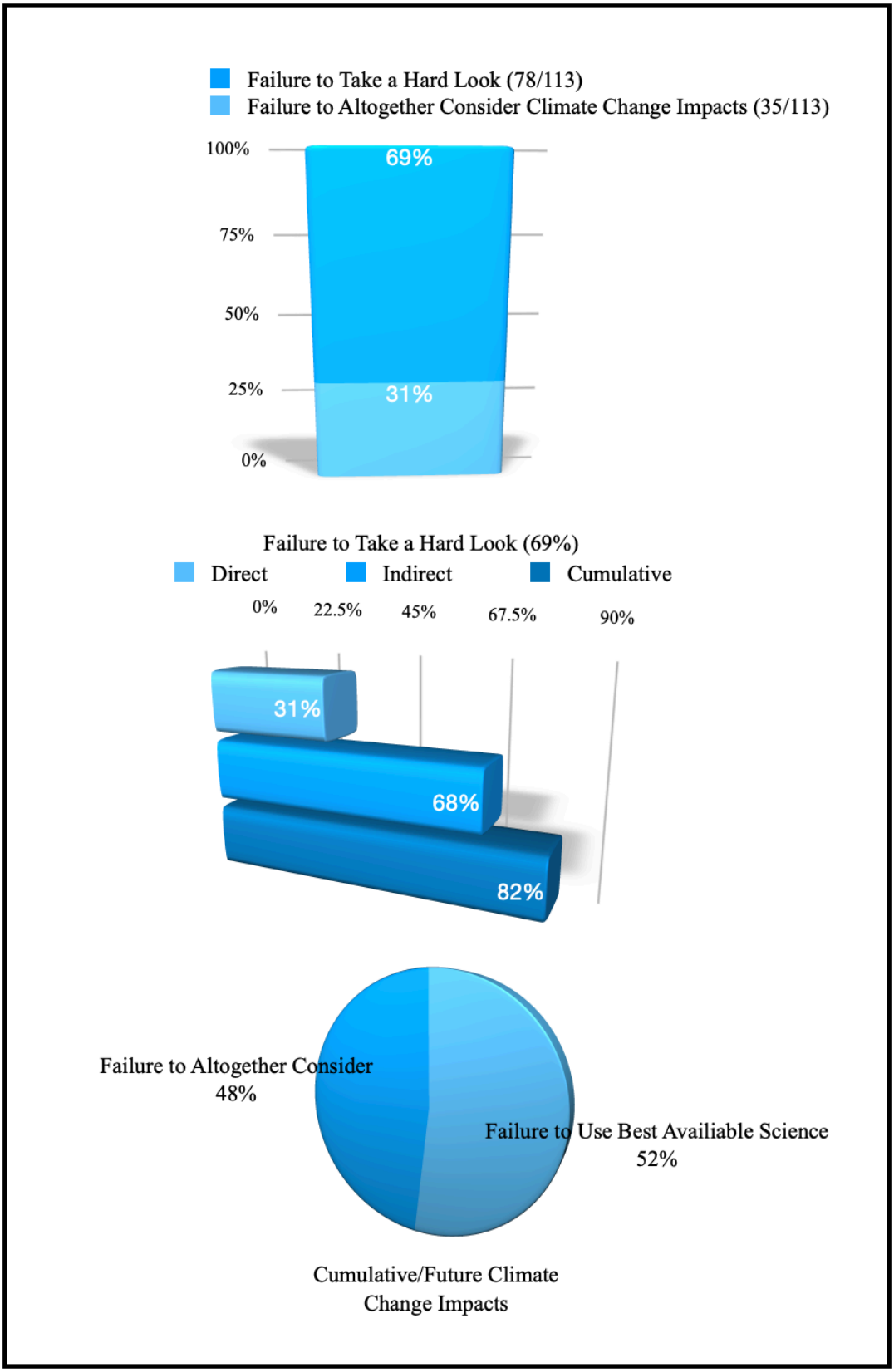
[532]. To view the Sabin Center's interactive database, *see* Sabin Center for Climate Change Law*, U.S. Climate Change Litigation*, http://climatecasechart.com/us-climate-change-litigation/ (last visited April 16, 2020). 113 CASES FOUND"—available in full, here: http://climatecasechart.com/search/?cn-reloaded=1&fwp_case_category=federal-statutory-claims&fwp_principal_law=national-environmental-policy-act-nepa&fwp_entity=2&fwp_filing_year=2015%2C2016%2C2017%2C2018%2C2019&fwp_per_page=100&fwp_sort=filing_year_desc (last visited April 16, 2020).

[533]. Computer textual software programs are available to the public and can facilitate selective text retrieval. *See* Silver C, Lewins A. Using software in qualitative research: a step-by-step guide. Thousand Oaks, CA; Sage: 2014. The Voyant tool is free and is available here: https://voyant-tools.org.

exhibits a synthesis of the data, unveiling the federal agencies involved and the specific alleged NEPA violations.

III. Data of the 113 NEPA Challenges (Table 6.1 and Figure 6.2)

Federal Agency	Times Challenged
Bureau of Land Management (BLM)	35
Department of the Interior's (DOI)	19
Forest Service (USFS)	13
Federal Energy Regulatory Commission (FERC)	13
Corps of Engineers (USACE)	11
Fish and Wildlife Service (FWS)	5
Department of Energy (DOE)	5
Department of Transportation (DOT)	5
Bureau of Reclamation's (BOR)	3
Bureau of Ocean Energy Management (BOEM)	3
Environmental Protection Agency (EPA)	2
Department of State (DOS)	2
Department of Homeland Security (DHS)	2
Office of Surface Mining Reclamation and Enforcement (OSMRE)	2
Department of Agriculture (USDA)	1
National Marine Fisheries Service (NMFS)	1
National Highway Traffic Safety Administration (NHTSA)	1
Department of Housing and Urban Development (HUD)	1
Department of Agriculture Farm Service Agency (FSA)	1
Tennessee Valley Authority (TVA)	1
Federal Emergency Management Agency (FEMA)	1
National Park Service (NPS)	1
Federal Highway Administration (FHA)	1
Food and Drug Administration (FDA)	1
Federal Aviation Administration (FAA)	1
Bureau of Safety and Environmental Enforcement (BSEE)	1


Failure to Take a Hard Look (78/113)
Failure to Altogether Consider Climate Change Impacts (35/113)
100%
75%
50%
25%
0%
69%
31%
Failure to Take a Hard Look (69%)
Direct
Indirect
Cumulative
0%
22.5%
45%
67.5%
90%
31%
68%
82%
Failure to Altogether Consider
48%
Failure to Use Best Availiable Science
52%
Cumulative/Future Climate
Change Impacts

IV. Results and Discussion

Each of the 113 NEPA complaints include some form of alleged failure by one or more federal agency (most likely implicating the BLM, DOI, USFS, FERC, and/or USACE) to adequately consider the impacts of its proposed action on climate change. While many complaints alleged failure to altogether consider the impacts of climate change (35/113), the vast majority (78/113) alleged failure to take a hard look at these impacts. These alleged failures to take a hard look resulted from an inadequate analysis of the direct (31%), indirect (68%), and/or cumulative (82%) impacts. While almost half of these cumulative impact failures concerned an altogether failure to consider (48%), the majority (52%) arose from inadequacies in research and disclosure with regards to the best available science required to address the reasonably foreseeable cumulative climate impacts.

Although the 113 complaints are simply filed complaints, which means that they may not necessarily result in successful outcomes (whereas some complaints are much further along in the litigation process and many are still within the early stages), this comparative analysis uncovers a deeply flawed process, where federal agencies are systematically failing to comply with the underlying goals of NEPA's public involvement and hard look requirements (not to mention its underlying public trust responsibilities, which is made explicit in the statute itself). The federal agencies' pattern of failing to review and disclose to the public the best available science, primarily with respect to the reasonably foreseeable cumulative climate impacts, is the policy and legal issue demanding the closest attention. As such information is essential to make a reasoned choice among alternatives, this systematic failure is effectively obscuring the projected climate impacts, curtailing public engagement, and otherwise diminishing NEPA's trust responsibilities and its underlying goals of informed decision making. In turn, as the federal government persists in this pattern of failing to account for the cumulative climate impacts of its proposed actions when added to other recent and reasonably foreseeable impacts, the most vulnerable communities among the rising and future generations stand to suffer the worst of the ever accumulating consequences, which issue strikes at the heart of intergenerational climate justice.

V. Conclusion

The 113 NEPA challenges indicate a pattern of failures to comply with the underlying goals of NEPA's public involvement and hard look requirements, where federal agencies are systematically failing to facilitate informed decision-making by, among other things, underestimating, obscuring, or altogether disregarding the best available science concerning the aggregate effects of their actions on climate change and the accompanying impacts imposed on rising and future generations. Such systematic failings are particularly troublesome for those communities among the rising and future generations that are already those most vulnerable to climate hazards, which stands in stark contradiction to the principles of intergenerational climate justice.

This chapter calls for more mixed methods data collection for further research, and it encourages a systematic approach based on this initial comparative analysis in doing so. Further research may not only help in identifying the conditions for more or less successful routine climate change litigation, but it may also help prompt policy change, influence public involvement, and contribute to the growing body of research aimed at holding the federal government accountable for the effects of its actions on climate change both now and in the future. With that, this chapter not only reiterates the notion that the ethical and legal recognition of intergenerational climate justice in modern environmental statutory law is limited in scope and needs to be invigorated, but also that the federal government has limitations in its ability to manage the impacts of climate change to help communities adapt to their unique situation as the problems worsen over time.[534] The final chapter of this dissertation focuses on this adaptation aspect of intergenerational climate justice, and it does so by combining the findings from the sociolegal studies above with that of socio-ecological

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[534]. *See* James J Patterson et. al., *Political feasibility of 1.5 C societal transformations: the role of social justice*, Current Opinion in Environmental Sustainability 31, 1-9, 2018, https://www.sciencedirect.com/science/article/pii/S1877343517300660; *See also* Elizabeth D. Gibbons, *Climate Change, Children's Rights, and the Pursuit of Intergenerational Climate Justice*, *Health and Human Rights Journal*, (2014) https://cdn1.sph.harvard.edu/wp-content/uploads/sites/2469/2014/06/Gibbons1.pdf; *See also* J. Barnett and J. Palutikof, *The limits to adaptation: a comparative analysis*, UK: John Wiley, (2015) 238; *See also* Fischer, E.M., Sippel, S. & Knutti, R. *Increasing probability of record-shattering climate extremes*, *Nat. Clim. Chang.* (2021). https://doi.org/10.1038/s41558-021-01092-9 (*explaining* that if emissions start falling immediately and rapidly, the risk of record-shattering extremes would be cut by about 80%).

systems resilience theory to offer a viable option for the development of climate adaptation law in the United States.

Chapter 7: Toward a Resilient Future: Intergenerational Climate Justice and Resilience Theory for the Development of Climate Adaptation Law in the United States

I. Introduction

Even if the United States mitigates greenhouse-gas emissions as rapidly as is plausible, the latest IPCC findings (2021) confirm that global temperatures will reach and even likely exceed the critical threshold of 1.5°C warming by the early-to-mid 2030s.[535] Crossing this temperature threshold is certain to bring about catastrophic changes and consequences, and the brunt of these impacts will be experienced by those communities with the lowest adaptive capacities among the rising and future generations.[536] As detailed in previous chapters, when rising and future generations face these increased impacts because of the trade-offs in which the interests of the federal government of this generation continue to prevail over future interests, an issue of intergenerational climate justice arises.[537] In turn, the federal government remains constrained within an ethical and legal decision-space whereby it must account for and respond to the circumstances that influence both how and to what extent climate impacts will be experienced particularly by those most vulnerable among the rising and future generations.[538]

To directly address this adaptation issue of intergenerational climate justice, this chapter argues for the immediate integration of resilience assessments for the application of

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535. Even in the lowest emissions scenario considered in the 2021 IPCC report (i.e., SSP1-1.9), Earth will reach 1.5°C warming for a few decades—but then drop back below it by the end of the century. *See* IPCC, 2021: *Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis*. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press.

536. *See* Jeff Tollefson, *IPCC climate report: Earth is warmer than it's been in 125,000 years*, (09 August 2021) https://www.nature.com/articles/d41586-021-02179-1?fbclid=IwAR2lZVPEtII0XqU7NEV4mYVgV2jk-3jYfJecHi1ifWH9sv2qkowVKsCr8iI; *See* Robinson Meyer, *It's Grim: The latest UN report is clear: Climate change is here, it's a crisis, and it's caused by fossil fuels* https://www.theatlantic.com/science/archive/2021/08/latest-ipcc-report-catastrophe/619698/?fbclid=IwAR14UKDvDSITtwoJxZJHmE0G8ybeXby59kvgoP5U_fbwpRIT4WunSxoySgs.

537. *See* David Weisbach & Cass Sunstein, *Climate Change and Discounting the Future: A Guide for the Perplexed*, 27 Yale L. & Pol'y Rev. (2008), *See also* David Schlosberg et. al., *Adaptation policy and community discourse: risk, vulnerability, and just transformation*, Environmental Politics 26 (3), 413-437, (2017).

538. *See supra* Chapter 1; *see also* Burns Weston, *Climate Change and Intergenerational Justice: Foundational Reflections*, 9 VT. J.ENV'TL. 375 (2008).

climate adaptation law in the United States.[539] To that end, and following this Introduction, Section II provides a brief overview of socio-ecological systems (SES) resilience theory, which practitioners and theorists alike regard as a leading and best available sustainability science and practice. Section III highlights the role of resilience assessments as a critical initiative used to identify, measure, and ultimately enhance the adaptive capacity of rising and future generations. Section IV advances the option for resilience assessments to be used in agency programs and decision-making under the bedrock environmental law of NEPA. Section V concludes this chapter by reiterating the importance of integrating the use of resilience assessments under NEPA, for the intentional outcome of intergenerational climate justice.

II. Primer: SES Resilience Theory

Ecologist C.S. Holling first coined the phrase "ecological resilience" in 1973, and he described it as the amount of disturbance that an ecosystem can withstand without changing into an alternative stable state.[540] Holling observed that an ecosystem's ability to *withstand* is not limited to resistance to a threshold and shift to a new state, but that these systems self-organize to adapt—and, thus, an ecosystem has the potential to withstand a shift to an alternative state through both resistance and adaptation.[541] Over time, this observation enabled a novel understanding that SESs move through a process of self-organization where the capacity of a system to sustain growth declines as it matures and other processes interact that may either promote or reduce adaptive capacity.[542]

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[539]. *See* Janna Thompson, *Intergenerational Justice: Rights and Responsibilities in an Intergenerational Polity* (2009), at 202. (*warning* against decisions that will unduly restrict the options available to future generations). This strategy may also be useful for a resolution in the current settlement attempts for *Juliana* case, as well as for the issues surrounding routine climate change litigation.

[540]. Holling, C.S. *Resilience and stability of ecological systems*, 4 Annual Review of Ecology and Systematics 1-23 (1973) http://dx.doi.org/10.1146/annurev.es.04.110173.000245 (*explaining* the core concept of "multiple basins of attraction"—i.e., that ecosystems may fluctuate substantially while persisting in the same basic structure and function). Holling also described resilience as "the amount of external pressure that is needed to bring about a given amount of disturbance in the system." *Id*.

[541]. Holling, C.S. (1996) *Engineering Resilience versus Ecological Resilience*. In: Schulze, P.E., Ed., Engineering within Ecological Constraints, National Academy Press, Washington DC, 31-43.

[542]. Holling, C. S. 1986. *Resilience of ecosystems; local surprise and global change*. pp. 292-317 in Sustainable Development of the Biosphere, W. C. Clark and R. E. Munn, editors. Cambridge University Press, Cambridge.

By 1986, Holling's resilience perspective was developed into a conceptual model of an "adaptive cycle."[543] (*See* Figure 7.1) This visual metaphor describes the pattern of how SESs respond to disturbances and rapid change and behave across time.[544] The adaptive cycle is based on four phases in system dynamics: (1) *exploitation*—in which systems have ample resources to respond dynamically to unexpected disturbances; (2) *conservation*—in which systems become more efficient but less adaptable to unexpected disturbances as they approach thresholds; (3) *release*—in which established functions are destroyed following the crossing of a threshold; and (4) *reorganization*—in which new structures and thresholds are then established.[545]

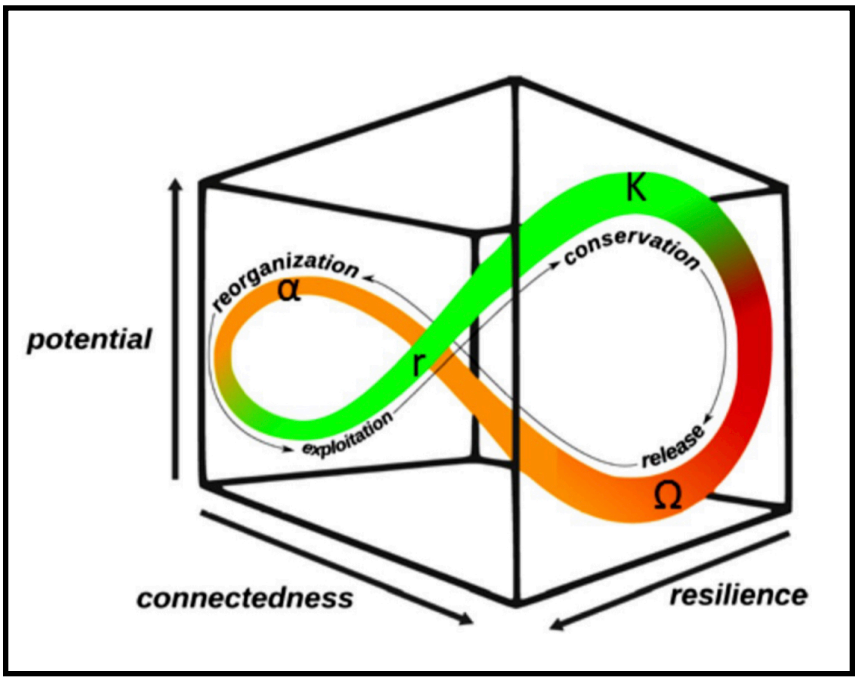

Figure 7.1 A depiction of the adaptive cycle metaphor. The *release* and *reorganization* phases are fast and unpredictable and are critical to determining a SES's trajectory. Three dimensions define the phases: (1) *potential*, or the range of accumulated resources; (2) *connectedness*, or the degree of connection between variables and internal controlling processes; and (3) *resilience*, or the amount of

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[543]. *Id*.

[544]. *Id*.

[545]. Castell, W., Schrenk, H. *Computing the adaptive cycle, Sci Rep* 10, 18175 (2020). https://doi.org/10.1038/s41598-020-74888-y

> disturbance that a system can withstand before crossing a threshold into an alternative stable state.[546]

The concept of *panarchy* emerged in the early 2000s, and it added critical insight to the adaptive cycle metaphor by explaining how the processes of SESs extend across both space and time as nested, interacting sets of adaptive cycles.[547] In other words, each SES experiences the adaptive cycle on different spatial and temporal scales, where each scale contains its own structures and functions, but it also influences, and is influenced by, processes occurring on other scales.[548] One of the most important aspects of panarchy is that external input or internal innovation from society can cause a system to skip a phase, or return to a prior, or entirely transform to an alternative system state.[549] Moreover, the concept of panarchy illustrates how intervention from a higher scale (e.g., the federal government) or innovation from a smaller scale (e.g., local governments and stakeholders) can alter the trajectory of a SES to a more desirable state.

SES resilience theory is not only a useful conceptual framework that improves the understanding of how intertwined SESs experience dynamic change, but it also underscores the importance of taking anticipatory actions to identify the trajectory of a SES that might signal the approach of thresholds. The main takeaway here is that this understanding, including the benefits and harms that could entail in crossing a threshold, can be used to redirect and navigate toward a more desirable system state—all while managing the shift by

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[546]. *Id*.

[547]. Gunderson, L. & Holling, C. *Panarchy: Understanding Transformations in Human and Natural Systems* (Island Press, Washington, D.C., 2002) (*explaining* that natural systems are linked together forming a hierarchical structure of adaptive cycles of growth, accumulation, restructuring, and renewal).

[548] *See* Walker, Brian, and David Salt, *Resilience thinking: sustaining ecosystems and people in a changing world*. Island press, 2012 (*explaining* that systems on a lower scale can trigger a crisis towards a release phase on a higher scale, and the systems on a higher scale may shape dynamics on a lower scale).

[549]. Gunderson, L. & Holling, C. *Panarchy: Understanding Transformations in Human and Natural Systems* (Island Press, Washington, D.C., 2002).

enhancing the adaptive capacity for those most vulnerable among the rising and future generations.[550]

III. Resilience Assessment

A. What is it?

A resilience assessment is a procedural analysis of the past, current, and potential future system dynamics associated with each unique and interconnected SES.[551] Developed by key stakeholders within a focal system, and framed within the adaptive cycle and panarchy metaphors, a resilience assessment builds knowledge of non-linear SES dynamics, interactions across temporal and spatial scales, thresholds of concern, and decision-making in the face of uncertainty.[552] A resilience assessment not only helps stakeholders identify the key components and variables that define the system state and its position within the adaptive cycle, but it also identifies the environmental and social impacts of disturbances, the amount of change that a system can undergo, the degree to which a system is capable of self-organization, and the degree to which a system can build adaptive capacity.[553] It also explores alternative option spaces that consider plausible future trajectories that may lead to innovative management strategies to either maintain the current system state or spur an intentional transformation.

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[550]. Gunderson, Lance (2000) *Ecological Resilience--In Theory and Application*, *Annual Review of Ecology and Systematics* 31: 425-439 https://www.annualreviews.org/doi/abs/10.1146/annurev.ecolsys.31.1.425 ; Folke C, Hahn T, Olsson P, Norberg J (2005) *Adaptive governance of social-ecological systems*. Ann Rev Environ Resour 30:441–473.

[551]. Referring to the adaptive cycle and panarchy metaphor, advanced by developing timelines based on past disturbances, considering cross-scale interactions, and consolidating the socio-ecological problems) Lebel, Louis, John M. Anderies, Bruce Campbell, Carl Folke, Steve Hatfield-Dodds, Terry P. Hughes & James Wilson, *Governance and the capacity to manage resilience in regional social-ecological systems*, 11(1) Ecology and Society 19 (2006) [online] URL: http://www.ecologyandsociety.org/vol11/iss1/art19/.

[552]. Folke, Carl. 2006. *Resilience: The emergence of a perspective for social–ecological systems analyses*. Global Environmental Change 16: 253–267. https://pdfs.semanticscholar.org/8b84/9a7bd57ab22102c2a821fcc99bdbca84bea9.pdf.; Quinlan et al. 2016 system pathways and identify those that are robust to shocks, disturbances, and other drivers of change

[553]. Resilience Alliance. 2010. *Assessing resilience in social-ecological systems: Workbook for practitioners*. Version 2.0. A resilience assessment "integrates a set of key concepts to provide an alternative way of thinking about and practicing natural resource management."

B. When is it Used?

A resilience assessment is used at anytime there is a need to understand how a SES works and will develop dynamically over time through the processes of adaptation and transformation.[554] A resilience assessment can be used when anticipating events of accelerating change and uncertainty, to more fully understand the external factors that influence the system, the internal variables that change with the system, and the specific time characteristics involved in approaching system thresholds.[555] A resilience assessment can also be used during a time of crisis or emergency, when a SES is experiencing a pathway of growth and lacks the adequate supply of external resources requiring an enhanced adaptive governance for resource management in real time.[556] Moreover, it is used at anytime there is a value and goal to sustain or improve the adaptive capacity of a SES to lessen harms and provide benefits to current and future society.

C. What is the Process?

The Stockholm Resilience Center provides a comprehensive resilience assessment process in its interactive guide: *Wayfinder: A Resilience Guide for Navigating toward Sustainable Futures*.[557] *Wayfinder* is a collaborative process with a generic approach to help stakeholders assess various types of SESs.[558] It contains a five step process, which can be summarized as follows: (1) assemble a team to design principles for engagement with interested stakeholder groups; (2) frame the process by identifying the aspirations, dilemmas, and key social and ecological components; (3) assess the system by creating a model of SES dynamics, cross-scale interactions, feedbacks, thresholds, and plausible future trajectories;

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554. Walker et. al. *Resilience management in social-ecological systems: a working hypothesis for a participatory approach* 2002. Conservation Ecology 6(1): 14.

555. *See* Stockholm Resilience Center, *Wayfinder: A Resilience Guide for Navigating Towards Sustainable Futures.*

556. Chapin, F.S., III, G. P. Kofinas and C. Folke, *Principles of ecosystem stewardship: Resilience-based natural resource management in a changing world*. (eds.) 2009. New York, Springer. (*presenting* a framework for managing ecosystems for ecological integrity and human well-being while embracing uncertainty and change).

557. *See Wayfinder: A Resilience Guide for Navigating toward Sustainable Futures, https:// wayfinder.earth/;*.

558. *Id*.

(4) plan for the future by designing innovative strategies for change; (5) move into action through a learning-by-doing approach to test the strategic plan and to continually refine it.

The Resilience Alliance developed a similar approach to resilience assessments, by using a workbook with strategic questions and activities, titled: *Assessing resilience in social-ecological systems: Workbook for practitioners*.[559] This issue-based approach is an iterative process that focuses on designing a conceptual model of the focal SES, which encapsulates "resources, stakeholders, and institutions, and identifies potential thresholds between alternative systems states in order to provide insight into factors that build or erode a system's resilience."[560] Similar to *Wayfinder*, the assessment includes five main steps: (1) stakeholders describe the system; (2) they develop understanding of system dynamics; (3) they probe system interactions; (4) they evaluate governance, and (5) they act on the assessment.[561] The workbook emphasizes how each assessment is unique and that each step requires referring back to earlier steps and revising as necessary.[562]

Both Wayfinder and Resilience Alliance highlight five essential inquires that are applicable to any resilience assessment, namely: (1) who needs to be in the room?; (2) what data, information, and local knowledge is used?; (3) how are the goals set?; (4) what types of scenarios should be explored, and how should decision-makers deal with uncertainty?; and (5) what do the outcomes look like, and are they updated? The following subsections respond in a way that is intended to help guide stakeholders and decision-makers in the governance process.

1. Who Needs to be in the Room?

Since a resilience assessment begins with the facilitation and interaction between and among interested stakeholders within a given SES, the question of who exactly these

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559. Resilience Alliance. 2010. Assessing resilience in social-ecological systems: Workbook for practitioners. Version 2.0.

560. *Id*.

561. *Id*.

562. Resilience Alliance. 2010. Assessing resilience in social-ecological systems: Workbook for practitioners. Version 2.0.

individuals are immediately arises.[563] When contemplating this issue within a focal system, there arises a need to explore social networks and examine social relations among individual actors or groups that either depend on natural resources or use their position to influence the governance process.[564] Map the extent of the stakeholder network and contact representatives and agents associated with key formal and informal institutions, with a message of a flexible, inclusive, diverse, and innovative collaboration among value-based stewards within the respective SES.[565] Within the Columbia River Basin (CRB), stakeholders within a nested system encompass a wide variety of actors and groups within the social system, including not only those who make decisions about and derive benefits from ecosystem services but also those who may be affected by changes in resource supply or management. Consider the extent of within the CRB including federal, state, and local agencies within the states of Oregon, Washington, Idaho, Montana, British Columbia along with tribal governments (fifteen U.S. Columbia River Basin tribes), environmental non-governmental organizations (recall the *WildEarth Guardians*), and land owners (examine water rights and priority dates), among those in the private sector, including economic groups: agriculture, resource extraction, and recreation.

2. What Data, Information, and Local knowledge is Used?

The process of this collaboration works to define the focal system's socio-ecological boundaries, by collectively addressing the values, main challenges, drivers of change,

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563. Enfors-Kautsky, E., L. Järnberg, A. Quinlan, and P. Ryan. 2021. *Wayfinder: a new generation of resilience practice*. *Ecology and Society* 26(2):39.

564. *See* document: https://www.resalliance.org/files/ResilienceAssessmentV2_2.pdf., at 40 (*describing* the importance of accounting for the differences in the level of dependence on natural resources).

565. *See* Dietz et al 2003: Dietz, T., Ostrom, E., Stern, P.C., 2003. *The struggle to govern the commons*. Science 302: 1907-1912.

potential thresholds, in addition to other biophysical, social, and economic components.[566] The outcome is intended to increase knowledge and identity of the system to influence the governance system to reflect its decision-making in the face of accelerating change and to continually look to the future. As stakeholders are tasked with identifying the factors that may build or erode resilience in the SES, a diversity of perspectives and methodologies is needed at the table—including not only formally trained experts in particular disciplines but also those with an informal yet insightful, rooted-experience; those who have a lived-understanding of the system to work together to identify the focal system's position within the adaptive cycle.[567] As a useful exercise in a collaborative process, developing a timeline of past disturbances that have affected the SES and emphasize key values and the factors that drove the system to its current phase within the adaptive cycle will feedback to the valuable-driven insight that can set and achieve the goals set while accounting for thresholds and future disturbances.

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[566]. Resilience Alliance. 2010. *Assessing resilience in social-ecological systems: Workbook for practitioners*. Version 2.0. pg. 40. For example of a resilience assessment of the catchment of Goulburn-Broken, Australia, the considerations included: the biophysical system included climate change, surface hydrology, groundwater, vegetation, river channels, wetlands, and floodplains; the biophysical subsystem included agricultural system thresholds, dry land biodiversity thresholds, and aquatic and wetland biodiversity thresholds; the social system included governance, social networks, institutions, and other human capital); political system (including laws— property rights and legal norms); economic system (including regional market, farm income and debt ratios, state of infrastructure, and other economic sectors; values and main challenges (threats to crop production, water storage decline, soil pH levels, native species decline, energy costs. Drivers of change (such as slow variables: markets demands for products and services). Holling, C.S. 2001. *Understanding the complexity of economic, social and ecological systems* Ecosystems 4: 390-405. Walker, et. al., *Resilience, adaptability, and transformability in the Goulburn-Broken Catchment, Australia*. 2009. Ecology and Society 14(1): 12.

[567]. *See* Reinette Biggs et. al., *Toward Principles for Enhancing the Resilience of Ecosystem Services*, Annual Review of Environment and Resources 2012 37:1, 421-448. (*explaining* seven strategies to build resilience: (1) Maintain response diversity and functional redundancy; (2) Manage connectivity, by providing links to sources of ecosystem recovery or providing new information and building trust in social networks; (3) Manage slow variables and feedbacks to maintain SES regimes that underlie the production of desired ecosystem services; (4) Foster an understanding of complex adaptive systems, by emphasizing the need for more integrated approaches, the importance of continual learning, and the pervasiveness of uncertainty in the management of SES; (5) Encourage learning about social-ecological dynamics and encourage experimentation through monitoring which is essential for enabling adaptation in response to changes in SES and ecosystem services; (6) Broaden participation, which is important for building trust and relationships because it facilitates the learning and collective action needed to respond to change and disturbance in SES; (7) Promote polycentric governance systems).

3. How are the Goals set?

By identifying the focal system's position in the adaptive cycle and pinpointing the key indicators of how the focal system has and will develop dynamically over time, the stakeholders can then form goals to intervene at potential thresholds and manage disproportionate vulnerabilities.[568] Opportunities to design innovative strategies for change and then set goals to navigate toward the desired system state emerge, and the achievement of such depends on the way in which key system components are managed—including the interaction, function, and response to rapid changes that are both internal and external to the system—while responding to constraints imposed from larger-scale systems or to innovation from smaller nested scales.[569] Conceptual diagrams are most useful here for synthesizing the full extent of social-ecological interactions in the focal system, whereby goals for resilience management may be set among stakeholders and become involved in deliberation influencing decision-making.

4. What Types of Scenarios Should be Explored, and How Should Decision-Makers Deal with Uncertainty?

Uncertainty around the timing and magnitude of threshold events, present complex challenges for proactive decision-making toward the goals desired among stakeholder for

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[568]. At the Columbia River Basin focal scale, first examine the data and information with regards to the SES components: physical resources and natural systems that provide food, energy, and water—(water economy: hydropower, navigation, irrigation, fisheries, anthropogenic alterations—irrigation, dams, agriculture, urban development, fish runs, wildlife, forest; Drivers of change: climate change (increasing average temperatures, snow-rain shift, flooding, drought, wildfire, pest and disease outbreak, invasive species) Land use and land cover change (population growth, growing demand for food, energy, and water; Changing values; slow variables: biodiversity loss, food web change, soils. The Scale Below (the many sub-basins); Biophysical System: water, rivers, groundwater, reservoir created by dam, contains critical habitat for steelhead; forested, minerals, precious metals; The Scale Above—National to Global:—Historic Timeline—Drivers of Change at larger scales (Impacts at CRB and Local Scale) Present day Drivers: Population growth, land use change, urbanization, climate change, hydrologic change, wildfire; and potential political will/resource management shift to "systems" approach (potential for precedent, CRT renegotiation with Canada); *See* Barbara Cosens & Alex Fremier, *Social-Ecological Resilience in the Columbia River Basin: The Role of Law and Governance*, *in* Practical Panarchy, *supra* note 9, at 47 ("[D]ams are a major factor in the decline of populations of salmon and steelhead species that are critical to the culture of Indigenous peoples." *See also* Cosens et al., *Introduction to AWG Project*.

[569]. The goals can be set by collectively answering the specified resilience question of "resilience of what, to what?" *See* Berkes, F., J. Colding and C. Folke, *Navigating Social-Ecological Systems: Building Resilience for Complexity and Change*. (eds.) 2003. Cambridge UK, Cambridge University Press.

navigating toward adaptive or transformative change.[570] However, in the face of rapid change, proactive decision-making toward these goals is required to break entrenched patterns and to enable more sustainable development trends.[571] Strategies for coping with uncertainty can be handled by probing the experts, and demanding the use of the best available science and information available to sustain a reasoned goal and choice among alternative options. While information, data, and local knowledge offered as evidence cannot fully eliminate uncertainty, such science, modeling, and trusted information enables decision-makers to assess the reliability, minimize uncertainty, and make sound judgments based on the best available information. That way, decision-makers can act in the face of uncertainty, all while leaving flexible option spaces for the future to respond to changing circumstances.

5. What do the Outcomes Look Like and are They Updated?

The resilience assessment process then moves to practical guidance for innovation from the focal scale or intervention from a higher scale to respond to the various forms of local climate impacts with a decision-making strategy.[572] The strategy is guided by a learning-by-doing approach to resource management, which enables management actions to follow the best available information to test the alternative scenarios and strategic plan and to continually learn from, refine, and improve an understanding of the system to better direct the goals and continually reduce the levels of uncertainty. This iterative process of adaptive management works to enhance collaborative capacity, trust, relationships and coordination among and between federal, state, and local agencies, tribes, and other public and private

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[570]. Resilience Alliance. 2010. *Assessing resilience in social-ecological systems: Workbook for practitioners*. Version 2.0. http://www.resalliance.org/3871.php.

[571]. *See* Carpenter et al., *From Metaphor to Measurement: Resilience of What to What?*, 2001. Ecosystems 4: 765-781. (*exploring* the operational indicators of resilience and then using those indicators, such as adaptive capacity, self-organization, and sustainability, in a discussion of the various uses of resilience). With regards to the process for designing innovative strategies for the desired adaptive or transformative change, resilience scholars Walker and Meyers have constructed a working database of published examples of regime shifts or thresholds. *See also* Walker, B. and J. A. Meyers, *Thresholds in ecological and social-ecological systems: a developing database*. 2004. Ecology and Society 9(2): 3. Explaining that this will enhance sustainability through intervention to shape thresholds and feedbacks in the socio-ecological system and even to provide ecological buffers that protects the system.

[572]. *See Wayfinder: A Resilience Guide for Navigating Towards Sustainable Futures*

sector stakeholders, while maintaining a learning-while-doing approach as a key mode of operation.

IV. Climate Adaptation Law: Integration of Resilience Assessments Under NEPA

NEPA already allows for resilience assessments to be used across all governance institutions that influence environmental management and regulation, and it includes systematic monitoring and navigation of its programs and decision-making to promote SES resilience in the context of intergenerational climate justice.[573] NEPA provides a baseline regulatory framework for generating and releasing environmental impact information, and all states already have analogous statutes applicable to state and local agencies and are accustomed to the procedural framework for generating similar information for proposed agency actions and their impacts.[574] The remaining two subsections further detail why the use of resilience assessments is already implicit in NEPA's main actions and key requirements, yet there still remains changes as to how NEPA's existing framework recognizes key differences among and between its impact assessments and a resilience assessment, how it reconciles new solutions, and how amendments are needed for full integration of the use of resilience assessments under its legal framework.

A. Why the Use of Resilience Assessments is Readily Applicable Under NEPA's Main Actions and Key Requirements

The use of resilience assessment is readily applicable under three of NEPA's main actions and key requirements, namely: (1) the integrated effort and interdisciplinary approach; (2) the "hard look" analysis, and its early application; and (3) the alternatives analysis and enhanced public involvement.

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[573]. Fischman et al is an example of research that examines how to achieve flexibility within existing environmental statues (namely, the Endangered Species Act) to increase collaboration and climate adaptation law in the United States. *See* Robert L. Fischman, Vicky J. Meretsky, & Matthew P. Castelli, *Collaborative Governance Under the Endangered Species Act: An Empirical Analysis of Protective Regulations*, Research Paper Number 402, 38 Yale J. Regulation 976-1058 (2021); *See also* Gosnell, et., al,. 2017. *Transforming (perceived) rigidity in environmental law through adaptive governance: a case of Endangered Species Act implementation*. Ecology and Society 22(4):42.

[574]. Thrower, Julie, *Adaptive Management and NEPA: How a Nonequilibrium View of Ecosystem Mandates Flexible Regulation*," Ecology Law Quarterly 33, no. 3 (2006): 871-896 https://heinonline.org/HOL/Page?handle=hein.journals/eclawq33&div=30&g_sent=1&casa_token=&collection=journals.

First, NEPA demands an integrated effort and an interdisciplinary approach, which includes directives from various sources, such as: executive orders, CEQ regulations and guidance, and agency policy and regulations, and it includes coordination among all federal agencies.[575] NEPA is often called an umbrella statute because it encourages agencies to incorporate all applicable environmental requirements into one analysis for a streamlined decision-making process.[576] It requires all credible environmental disciplines (e.g., SES resilience science and practice) included into the planning and decision-making process.[577] This is applicable both throughout resilience assessment and the development of NEPA's document stage (including the Environmental Assessment (EA) and Environmental Impact Statement (EIS)), where an agency must anticipate the preparation of project and program planning, establishing resources and a team, and schedule into the future; its administrative record; its scoping process; its clear statements of purpose and need and proposed action; and its anticipation of screening alternatives as a range of reasonable alternatives. Moreover, an integrated resilience assessment would encapsulate all of these features.

Second, NEPA requires the early application of a "hard look" impact analysis.[578] From the inquiry as to whether a proposed action will have significant socio-ecological effects, NEPA requires all federal agencies to look to the best available science when analyzing the direct, indirect, and cumulative impacts of the proposed action. The significance criteria includes both *context*—including impacts on society as a whole; the particulars of the affected region; the locality; and short- and long-term effects—and *intensity*—including, the severity of the impact; the degree of the impacts; the degree of the controversy; if it is cumulatively significant; and if it threatens violation of another environmental law or agency regulation. Without a hard look of a systematic SES resilience assessment, any impact analysis would be deemed insufficient—as it would not fully account

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575. 42 USC §4321.

576. This broad applicability is evident in its language: 102(2) "Include in every recommendation or report on proposals for legislation and other major federal actions significantly affecting the quality of the human environment, a detailed EIS statement by the responsible official" See also National institute of justice — https://nij.ojp.gov/funding/national-environmental-policy-act-nepa

577. *See* NEPA § 102.

578. This leads to either the preparation of EIS or issuance of Finding Of No Significant Impact (FONSI).

for the non-linear dynamics, thresholds, and feedbacks of the system and dismiss the initiation of a system of renewal and reorganization for the trajectory of a more stable and sustainable system.

Third, NEPA requires an alternative analysis and enhanced public involvement.[579] In the process of screening alternative feasibility, which includes a no action alternative and an environmentally preferable alternative, a resilience assessment would readily account for this in its options space—which would detail strategies for adaptive and transformative change and to avoid locking systems into trajectories that restrict and reduce future choices.[580] As NEPA requires transparent disclosure of information presented concisely to the public, the resilience assessment would fill this need by providing information essential for decision-makers and the public for them to make a reasoned choice among alternatives. Resilience assessments are also applicable in all interim actions: i.e., programmatic analysis; tiering; supplementing analysis; multiple record of decision (ROD), and changes to RODs, as a resilience assessment would inform and guide the direction of each consideration involved in the NEPA analysis. The NEPA impact assessment could then determine the system trajectory, developed by those that reflect the values and concerns of the communities and extend across generations, and direct flexible management to improve the structural and functional capacities of a SES.

B. Achieving Full Integration: Embracing Key Differences, Handling New Solutions, and Making Meaningful Amendments

To achieve full integration of resilience assessment under NEPA, three main inquires arise: (1) In what way does an EIS differ from a resilience assessment; (2) What type of problems would a resilience assessment be useful for; and (3) How would NEPA need to be amended to both allow for the reconciliation of the differences between EIS and RA to be used and how judicial review should take place.

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[579]. CEQ regulations 1500.2 (e) "Use the NEPA process to assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment."

[580]. The CEQ explains that — 1500.2 (b) Environmental impact statements shall be concise, clear, and to the point, and shall be supported by evidence that agencies have made the necessary environmental analyses.

First, one difference between an EIS and a resilience assessment is who is included in the room. On the one hand, in an EIS, the agency experts are the ones in the room, and they then inform the public; on the other hand, with a resilience assessment, all interested stakeholders are encouraged to drive the process. Another difference is how goals are set. Whereas an EIS is systematically conditioned to focus its assessment on maintaining the system in its current state, a resilience assessment bases its goal setting on the non-liner dynamics and the potential of approaching and crossing thresholds. Also, a resilience assessment handles uncertainty as geared toward making decision that increase a system's resilience to disturbance and its protection of those most vulnerable to adapt. Another key difference between an EIS and a resilience assessment is the resilience assessment's ongoing updating, by viewing solutions that address individual problems as they arise as problematic.

Second, NEPA's assumption of a static model of the environment can make a system more vulnerable by ignoring critical system properties that may go unnoticed until a threshold is crossed. This is the type of problem that a resilience assessment would be useful for in an EIS. It would reconcile the differences identified in the paragraph above. A resilience assessment would contribute to the depth of information dealing with change as always occurring, and spotlight how to manage for resilience with an understanding of cycles of change and the vulnerabilities and windows of opportunity that these cycles of change introduce to the system.

Last, amending NEPA would not only allow for the differences between and EIS and resilience assessment to be reconciled, but also inform how judicial review should take place. Amend the law to allowing for the differences to be reconciled by stipulating that federal agencies must prepare a resilience assessments as part of the environmental impact statements that disclose the effects of, and alternatives to, action impacts related to resilience and capacity building.[581] The procedural framework for generating information for proposed agency activities can then use this information to adjust the goals for policy

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[581]. Thrower, Julie, *Adaptive Management and NEPA: How a Nonequilibrium View of Ecosystem Mandates Flexible Regulation* Ecology Law Quarterly 33, no. 3 (2006): 871-896.

implementation.[582] The regulatory context of an EIS would ensure the implementation of resilience assessments as a more formalized process of interagency cooperation.[583] The legislative directives must also include sufficient resources and incentives for regulators and stakeholders and continually encourage learning-by-doing.[584]

Judicial review under NEPA is based on the procedure and the EIS document, which is a one time review. For resilience assessments, there must always be a review based on progress toward achieving the goals, where the higher levels of government place boundaries on the processes by providing clear, legally binding goals and standards while delegating the authority to innovate and adaptively manage to the level of government closest to the problem.[585] The local levels are afforded flexibility in implementation and experimentation with public participation but retain no discretion to adjust the regulated baseline set by the higher levels of government.[586] This enables a break in the gridlock of judicial review and the learning-by-doing structure necessary to confront the complex and uncertain impacts of accelerating change.[587] The focus is on whether the posed implementation measure has a reasonable relation to the goal, guided by principles of intergenerational climate justice, and whether the implementation is achieving outcomes that are trending toward the specified goal; including whether there is any violation of individual rights.[588]

V. Conclusion

Resilience thinking helps define the parameters of the federal government's political and legal decision-space, whereby it must account for and respond to the climate impacts

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582. Shalanda H. Baker, *Adaptive Law in the Anthropocene,* 90 Chi.-Kent L. Rev. 563 (2015) (*explaining* that this is a process known as triple loop learning).

583. *See* Gosnell et. al., at 42.

584. *See Id.* Top-down regulations and government programs could enhance further stakeholder innovation and provide incentives for enhanced collaboration to prevent further top-down regulation.

585. *See also* Cosens, B. A., et. al., *The role of law in adaptive governance*. (2017) *Ecology and Society* 22(1): 30.

586. *Id*.

587. *Id*. This governance arrangement also requires "information pooling", which is an essential aspect of inserting stability back into the flexible government design to allow for experimentations for preferable solutions. This information pooling will increase the efficiency of public administration, heighten accountability, and enhance the ability of agencies to assist the regulated entities and actors all while monitoring their performance.

588. *See* Dorf & Sabel, at 288, 398–400.

projected toward those most vulnerable among the rising and future generations. The use of resilience assessments under NEPA is a practical solution for the immediate development of climate adaptation law in the United States. This integration of resilience assessments under NEPA would allow for a better and more unified understanding and decision-making process with respect to managing how systems respond to disturbances and change, the possibility of alternative system regimes and the thresholds between them, and how a crisis or emergency can be understood as an opportunity to navigate a system to a desired state. This integration would also enable a rapid and unified response while enabling states and local governments to advance practical applications to solve their own unique SES situations and to manage the disproportionate impacts that shape the trajectory of the system state for rising and future generations.

Conclusion

The scientific consensus has confirmed that climate harms and burdens will most severely impact those most vulnerable among the perpetually rising generations of the future. The political branches of the federal government continue to respond to these concerns by taking actions that exacerbate the problem, all while deferring mitigatory and adaptive measures to rising and future generations. In turn, the vulnerable young are left powerless to control the circumstances that shape their current and future interests. Because the federal government's contributions to the climate crisis presents disproportionate effects imposed primarily on the interests of rising and future generations, the federal government, regardless of the political majority in power, is constrained within an ethical and legal decision-space of intergenerational climate justice whereby sufficient mitigatory and adaptive measures must be actively pursued. This sociolegal recognition of intergenerational climate justice must be immediately implemented within the existing political and legal institutions in the United States.

It is both feasible and beneficial for the United States to move its economy away from fossil fuel reliance, and the costs of mitigating climate change are now manageable. A declaration by the judicial branch of a fundamental right to a climate system capable of sustaining human life, preserved and protected by the political branches of the federal government via public trust obligations, is legally viable. Nevertheless, federal agencies are accountable to the conducting of meaningful review of proposed significant actions with projected climate impacts and must be informed by the best available climate science to ensure a reasoned choice among the decision-makers and the public as to how those actions will impact those forced to live with the impending consequences. The use of resilience assessments can be readily integrated under NEPA to adequately inform the decision-makers and the public with respect to each unique and interconnected socio-ecological system while honoring intergenerational climate justice. Further interdisciplinary research may help prompt sociolegal change, influence public knowledge and involvement, and contribute to the growing body of research aimed at holding the federal government accountable for the disproportionate effects of its actions on climate change both now and in the future.

Appendix A: The Science Informing the Children's Lawsuit

The litigation strategy set forth by the children plaintiffs in the *Juliana* case includes a science-based climate recovery plan designed to reduce atmospheric CO_2 concentrations below 350 ppm by the year 2100.[589] The scientific predictions are based on models interpreted as the "Hansen prescription."[590] The Hansen prescription represents the "best available science" concerning actions necessary to avert climate catastrophe.[591]

Professor James Hansen, former head of NASA's Goddard Institute for Space Studies and professor at Columbia University's Earth Institute, formed an international team of scientists to research the connection among atmospheric CO_2 concentrations and global temperature and set out to provide model projections based on that research.[592] The Hansen team is a counterpart to the concurrent science produced by the United Nations Intergovernmental Panel on Climate Change (IPCC).[593] In its Fifth Assessment in 2014, the IPCC Working Group concluded that without efforts to reduce anthropogenic greenhouse gas emissions, atmospheric concentrations will at their baseline exceed 850 ppm by 2100.[594] In turn, the IPCC projected that such CO_2 levels implicate an increase of global temperature well above the threshold sufficient to initiate a runaway greenhouse effect.[595]

While the IPCC focused on the overall temperature increase—applying a stringent mitigation scenario to keep warming under two degrees Celsius—the Hansen team took a slightly different approach.[596] The Hansen team focused on exploring the connection among

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589. *See generally Juliana*, 217 F. Supp. 3d at 1224.

590. *See* Michael C. Blumm & Mary C. Wood, *"No Ordinary Lawsuit": Climate Change, Due Process, and the Public Trust Doctrine*, 67 AM. U. L. REV. 1, 16–17 (2017).

591. *Id.* at 16.

592. Suzanne Goldenberg, *UN's 2C Target Will Fail to Avoid a Climate Disaster, Scientists Warn*, GUARDIAN (Dec. 3, 2013, 6:28 PM), https://www.theguardian.com/environment/2013/dec/03/un-2c-global-warming-climate-change).

593. Dana Nuccitelli, *30 Years Later, Deniers are Still Lying About Hansen's Amazing Global Warming Prediction*, GUARDIAN (June 25, 2018), https://www.theguardian.com/environment/climate-consensus-97-per-cent/2018/jun/25/30-years-later-deniers-are-still-lying-about-hansens-amazing-global-warming-prediction.

594. *See* IPCC, CLIMATE CHANGE 2014 SYNTHESIS REPORT SUMMARY FOR POLICYMAKERS (2014), https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf.

595. *Id.*

596. *Id.*

atmospheric CO_2 concentrations and the stable state of Earth's energy.[597] The Hansen team likewise concluded that the global climate is reaching a dangerous ecological threshold, which, if reached, will trigger positive feedback processes that will unleash an irreversible heating trend capable of shifting the balance of Earth's climate system to a state uninhabitable by humans.[598]

A. What are Greenhouse Gases and the Greenhouse Effect?

A basic distinction when studying the science of Earth's climate is the difference between the following terms: greenhouse effect, global warming, and climate change. Greenhouse gasses are a class of gasses that trap heat near the Earth's surface.[599] The heat that is trapped leads to global warming; global warming alters the Earth's climate system, which leads to climate change.[600] The greenhouse effect, although largely enhanced by humans, is a natural process that allows for temperatures favorable for life on Earth to exist.[601] In the absence of this process, the estimated average temperature of the Earth would be -18° Celsius—also making Earth uninhabitable by humans.[602]

Earth's lower atmosphere is comprised of approximately 78% nitrogen, 21% oxygen, and 1% of other gases—of which CO_2 accounts for 0.04%.[603] CO_2 is the most prevalent greenhouse gas concentrated in the Earth's atmosphere.[604] The second most prevalent

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597. *See* Hansen, *supra* note 20, at 8.

598. *Id.* Current models suggest that global warming would fall outside human safety margins long before any runaway transition would occur because humid conditions hotter than 35° Celsius would make the planet uninhabitable because warm-blooded metabolisms produce more heat than can be dissipated into the surrounding air. *See* Lee Billings, *Fact or Fiction?: We Can Push the Planet into a Runaway Greenhouse Apocalypse*, SCI. AM. (July 13, 2013), https://www.scientificamerican.com/article/fact-or-fiction-runaway-greenhouse/.

599. *See* Philip Camill, *Global Change: An Overview*, NAT'L EDUC. KNOWLEDGE, https://www.nature.com/scitable/knowledge/library/global-change-an-overview-13255365 (last visited Nov. 11, 2018).

600. *Id.*

601. *Id.*

602. *See* Q. Ma & R.H. Tipping, *The Distribution of Density Matrices Over Potential-Energy Surfaces: Application to the Calculation of the Far-Wing Line Shapes for CO_2*, 108 J. CHEM. PHYS. 3386 (1998); *see also* Qiancheng Ma, *Greenhouse Gases: Refining the Role of Carbon Dioxide*, NASA (1998), https://www.giss.nasa.gov/research/briefs/ma_01/.

603. Anne Helmenstine, *The Chemical Composition of Air*, THOUGHT CO., https://www.thoughtco.com/chemical-composition-of-air-604288 (last updated Sep. 21, 2018).

604. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016*, EPA (Apr. 12, 2018), https://www.epa.gov/sites/production/files/2018-01/documents/2018_complete_report.pdf.

greenhouse gas, methane, is the most impactful in atmospheric heat retention, causing approximately 15% of all global warming experienced this century.[605] Next, nitrous oxide (laughing gas) is a greenhouse gas that traps heat 270 times more efficiently than CO_2.[606] What is more, this gas has increased in concentration by more than 20% since the Industrial Revolution.[607] Last, the manmade HFC and CFC family of chemicals, brought into existence by industrial chemists, are also notable greenhouse gases residing in the atmosphere.[608]

While there are numerous greenhouse gasses located in the atmosphere, scientists normalize to CO_2, or calculate to the CO_2 equivalent.[609] In other words, they calculate the other greenhouse gas contributions to a CO_2 equivalent so it can be expressed as one number. Thus, scientists will calculate a gas like methane, which has twenty-five times the warming potential of CO_2, by multiplying a unit of methane by twenty-five to reach the CO_2 equivalent.[610]

CO_2 is a byproduct brought about by the burning of fossil fuels.[611] Fossil fuels are often described as buried or fossilized sunshine.[612] That is, fossil fuels are the fossilized remains of ancient plant communities, which grew in swamps and wetlands, that produced the deposits that are now used by humans for energy—namely, coal, oil, and gas.[613] Out of the commonly used fossil fuels, coal produces the most CO_2 per unit burned.[614] Broken down to

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605. *Id.*; *see also Greenhouse Gas Emissions: Overview of Greenhouse Gases*, EPA, https://www.epa.gov/ghgemissions/overview-greenhouse-gases (last visited Mar. 20, 2019).

606. *See Greenhouse Gas Emissions: Understanding Global Warming Potentials*, EPA, https://www.epa.gov/ghgemissions/understanding-global-warming-potentials (last visited Mar. 20, 2019).

607. *Id*.

608. *See Chlorofluorocarbons (CFCs) and Hydrofluorocarbons (HFCs)*, MINN. POLLUTION CONTROL AGENCY, https://www.pca.state.mn.us/air/chlorofluorocarbons-cfcs-and-hydrofluorocarbons-hfcs (last visited Mar. 20, 2019). In addition to contributing to the warming of the lower atmosphere, Hydrofluorocarbons (HCFCs) and Chlorofluorocarbons (CFCs) destroy the earth's protective ozone layer, which shields the earth from ultraviolet (UV-B) rays generated from the sun. *Id.*

609. Zeke Hausfather, *Understanding Carbon Dioxide Equivalence: Common Climate Misconceptions*, YALE CLIMATE CONNECTIONS (Jan. 20, 2009), https://www.yaleclimateconnections.org/2009/01/common-climate-misconceptions-co-equivalence/.

610. *Id*.

611. *Id*.

612. *See* TIM FLANNERY, THE WEATHER MAKERS 61 (2006).

613. *Id*.

614. *Id*. at 4.

atmospheric CO_2 ppm concentrations, coal contributes to 41%, oil to 39%, and gas to 20%.[615] In perspective, burning one gallon of gasoline is equivalent to a forest fire burning 196,000 pounds of plant biomass.[616]

The sun, aside from being the creator of fossil fuels, is also the main driver of climate. "Sunlight intensity affects global winds, precipitation patterns, and ocean circulation".[617] This natural cycle exchanges CO_2 from the atmosphere to a drawdown into land biomasses as well as a drawdown into the world's oceans.[618] The oceans are all connected, and the surface currents are connected to the ocean depths, drawing CO_2 into natural sink deposits in a conveyor belt-like system.[619] As the oceans get warmer (and they are indeed getting warmer, as explained below), their capacity to absorb CO_2 is reduced.[620] In turn, ocean currents redistribute the net heat increase, along with moisture and CO_2, back into the atmosphere and across the surface of the Earth at a higher rate and greater intensity—altering global and regional climate patterns.[621]

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615. *See* FLANNERY, supra note 150, at 277.

616. *See* Jeff Dukes, *Bad Mileage: 98 Tons Plants per Gallon*, UNIV. OF UTAH NEWS CTR.: SCI. & TECH. (Oct. 27, 2003), https://archive.unews.utah.edu/news_releases/bad-mileage-98-tons-of-plants-per-gallon/.

617. *See* Alison N.P. Stevens, *Introduction to the Basic Drivers of Climate*, NATURE EDUC. KNOWLEDGE (2010), https://www.nature.com/scitable/knowledge/library/introduction-to-the-basic-drivers-of-climate-13368032; Figure 1:1.

618. *See* Vic DiVenere, *The Carbon Cycle and Earth's Climate*, COLUM. UNIV., http://www.columbia.edu/~vjd1/carbon.htm (last visited Mar. 20, 2019); *see also* I.C. Prentice, et. al., *The Carbon Cycle and Atmospheric Carbon Dioxide*, IPCC (2001), https://www.ipcc.ch/ipccreports/tar/wg1/pdf/TAR-03.PDF.

619. *See* Holli Riebeek, *The Ocean's Carbon Balance*, NASA: EARTH OBSERVATORY (July 1, 2008), https://earthobservatory.nasa.gov/Features/OceanCarbon/.

620. *Id.*

621. *Id.*; *see also* Stevens, *supra* note 155.

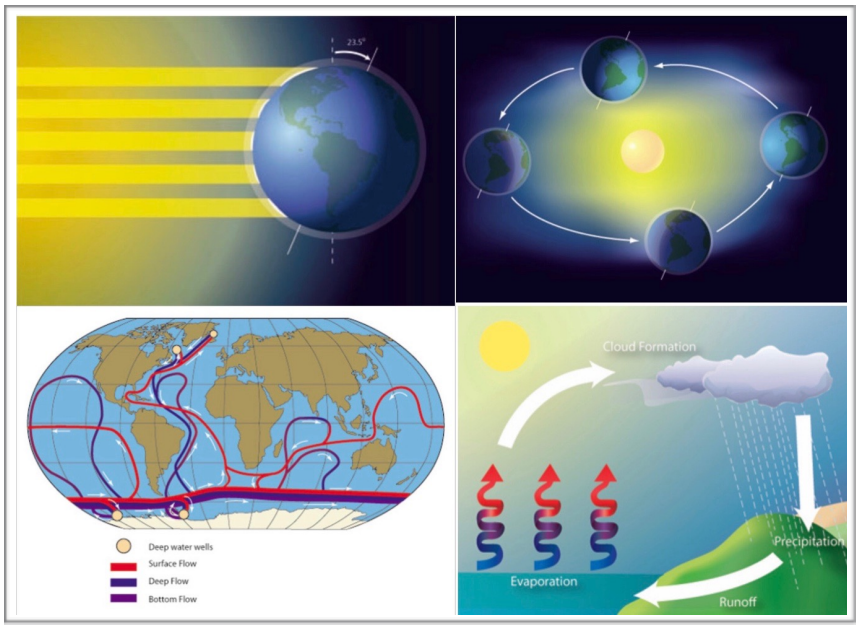

Figure A.1 The top two pictures show the Earth's relationship with the sun—the Earth's only external source of energy.[622] The bottom-left picture shows the stratified levels of ocean currents, which, in turn, affect atmospheric wind patterns.[623] The bottom-right picture shows precipitation patterns in connection with the oceans and atmospheric winds.[624]

It is understood by the relevant scientific community that when CO_2 is increased by human activities, mostly through the burning of coal and other fossil fuels, the atmosphere increases its CO_2 concentration.[625] This reduces the heat radiation that returns back to space —creating a temporary heat energy imbalance.[626] When heat is trapped from being released into outer space, a greenhouse effect takes place extending heat to the polar regions of the Earth.[627] Essentially, the greenhouse effect is the trapping of infrared radiation from being

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622. *See* Stevens, *supra* note 155.

623. *Id*.

624. *Id.*

625. *Global Warming FAQ*, UNION OF CONCERNED SCIENTISTS, https://www.ucsusa.org/global-warming/science-and-impacts/science/global-warming-faq.html#.W-jQDvZlDb0 (last visited Mar. 20, 2019).

626. *See* Michon Scott & Rebecca Lindsey, *Which Emits More Carbon Dioxide: Volcanoes or Human Activities?*, CLIMATE.GOV (June 15, 2016), https://www.climate.gov/news-features/climate-qa/which-emits-more-carbon-dioxide-volcanoes-or-human-activities.

627. *See* Philip Camill, *Global Change: An Overview*, NATURE EDUC. KNOWLEDGE PROJECT (2010), https://www.nature.com/scitable/knowledge/library/global-change-an-overview-13255365.

released back into space because of the blockage caused by greenhouse gases residing in the lower atmosphere.[628]

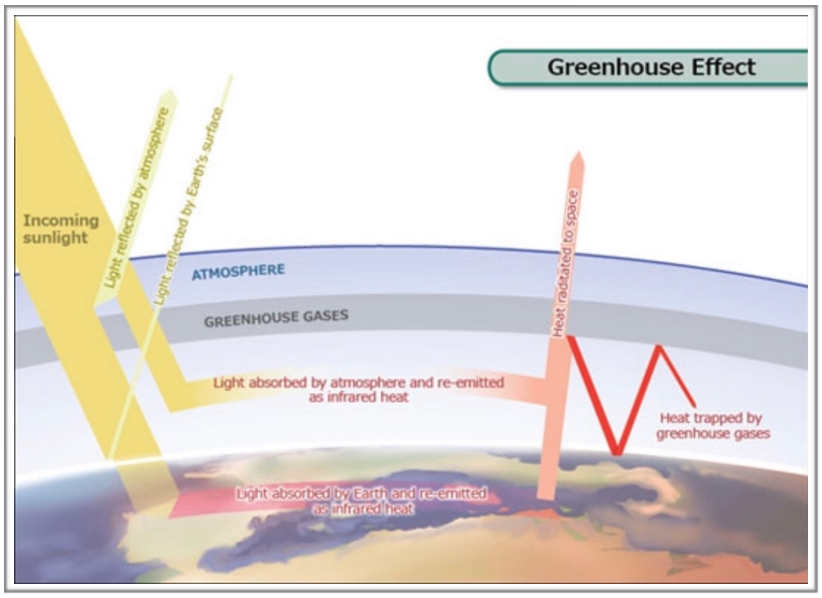

Figure A.2 A figure showing the greenhouse effect.[629] Focus on the infrared heat being trapped by greenhouse gases (located on the middle-right side of the figure).[630]

The Earth's temperature goes up when greenhouse gas concentrations are increased because the sun's rays (comprised of photons) excite the state of CO_2, which then causes expansion of the molecules and, in turn, causes the reflection of infrared energy back to the Earth's surface.[631] In other words, to the visible light from the sun, CO_2 is a transparent gas. But to the infrared energy emanating from the ground up, CO_2 is not so transparent. Thus, infrared energy is re-radiated back to Earth, which then increases Earth's overall heat energy.[632] Scientists look to human-induced fossil fuel emissions as the primary source of

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628. *See infra* Figure 1:2.

629. Edward B. Mondor & Michelle N. Tremblay, *Global Atmospheric Change and Animal Populations*, NATURE EDUC. KNOWLEDGE PROJECT (2010), https://www.nature.com/scitable/knowledge/library/global-atmospheric-change-and-animal-populations-13254648.

630. *Id*.

631. *Id*.

632. *See* Pieter Tans, *If Carbon Dioxide Makes up Only a Minute Portion of the Atmosphere, How Can Global Warming Be Traced to It? And How Can Such a Tiny Amount of Change Produce Such Large Effects?*, SCI. AM. (Jul. 24, 2006), https://www.scientificamerican.com/article/if-carbon-dioxide-makes-u/.

CO_2 because it is calculated that humans emit roughly forty billion metric tons of CO_2 per year.[633] In perspective, that is over sixty times the amount of CO_2 released by natural processes each year.[634] Moreover, the total human emission equals more than 2,000 billion metric tons of CO_2 since the Industrial Revolution.[635] The emissions mainly show up in our economy, in sectors such as electricity energy, land-use, transportation, and etcetera.[636]

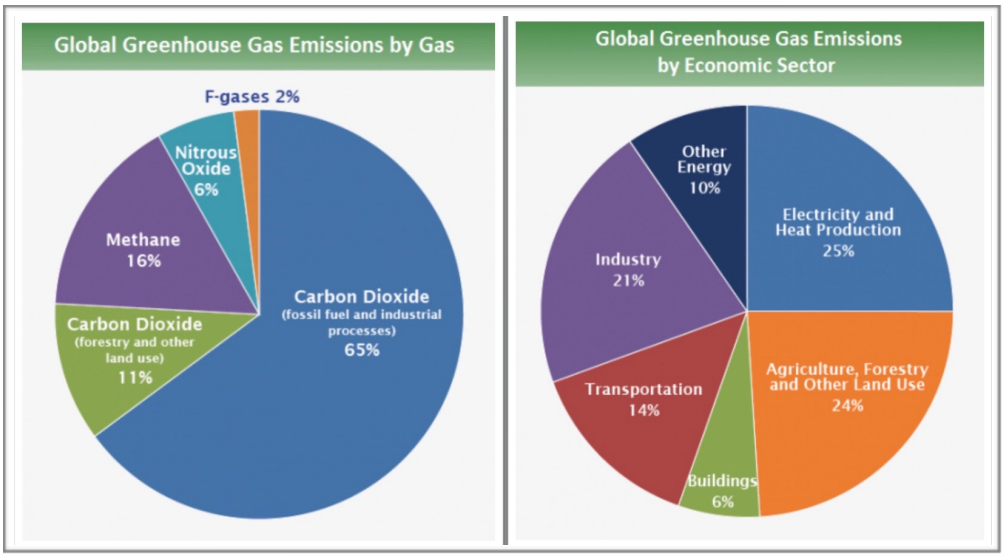

Figure A.3 (left) Graph showing CO_2 as the majority Greenhouse Gas emitted.[637]
Figure A.4 (right) Graph showing GHG emissions by economic sector.[638]

B. What are Positive Feedbacks and How Does that Exacerbate the Problem?

Rapid global warming is due mainly to the greenhouse effect caused by human-induced greenhouse gas emissions into the atmosphere.[639] The Tropopause portion of the atmosphere,

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633. *Global Greenhouse Gas Emissions Data*, EPA (Apr. 13, 2017), https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data; *see infra* Figure 1:3.

634. *See* Michon Scott & Rebecca Lindsey, *Which Emits More Carbon Dioxide: Volcanoes or Human Activities?*, CLIMATE.GOV (June 15, 2016), https://www.climate.gov/news-features/climate-qa/which-emits-more-carbon-dioxide-volcanoes-or-human-activities.

635. *Id.*; *see also* Michael Beman, *Energy Economics in Ecosystems*, NATURE EDUC. KNOWLEDGE PROJECT (2010), https://www.nature.com/scitable/knowledge/library/energy-economics-in-ecosystems-13254442.

636. *Global Greenhouse Gas Emissions Data*, EPA (2018), https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data; *see infra* Figure 1:4.

637. *Id.*

638. *Id.*

639. *Facts*, NASA, https://climate.nasa.gov/causes/ (last visited Mar. 20, 2019).

located approximately seven miles above Earth's surface, is where most of the greenhouse gasses reside.[640] The Tropopause is also where much of Earth's weather is generated.[641] Global warming intensifies the Tropopause and spreads the heat to the poles, which proliferates the melting of polar ice sheets and makes the planet darker, so it absorbs more sunlight and becomes even warmer.[642] The warmer oceans release more CO_2, and more CO_2 causes more warming.[643] But, because the climate system has great inertia, there is a lag in the effects experienced in real time.[644] Because ice is reflective, a large proportion of the sunlight that hits the ice is bounced back to space, which limits the amount of warming it causes—characterized as the Albedo Effect.[645] Fresh snow and ice reflects around 80% of heat energy out into space, while water only reflects around 8%.[646] "As the [Earth] gets [warmer], ice melts, revealing the darker-colored land or water below. The result is that more of the sun's energy is absorbed, leading to more warming, which in turn leads to more ice melting—and so on."[647]

This phenomenon is characterized as a positive feedback loop.[648] Occurring within this loop, CO_2 acts as a "trigger" for water vapor due to the fact that warmer air masses are capable of holding more water than cooler ones.[649] CO_2 acts as a trigger by allowing the atmosphere to heat up through radiation, allowing it to retain more moisture, which then

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640. *See* Davide Castelvecchi, *With One Space Observatory Down, NASA Uses Another to Map CO_2*, SCI. AM. (Dec. 17, 2009), https://www.scientificamerican.com/article/space-observatory-co2-nasa/; *see generally Tropopause*, ENCYCLOPEDIA BRITANNICA, https://www.britannica.com/science/tropopause (last visited Mar. 20, 2019).

641. *See* Castelvecchi, *supra* note 177. *See generally* Mark E. Piana, *Hadley Cells*, SEAS HARV. EDU., https://www.seas.harvard.edu/climate/eli/research/equable/hadley.html (last visited Mar. 20, 2019) ("Hadley Cells are low-latitude overturning circulations that have air rising at the equator and air sinking at roughly 30° latitude. They are responsible for the trade winds in the Tropics and control low-latitude weather patterns.").

642. *See* FLANNERY, *supra* note 150, at 26.

643. *Id.*

644. *See* Hansen et al., *supra* note 20, at 1.

645. *See* FLANNERY, *supra* note 150, at 26 (albedo is Latin for whiteness).

646. *See Cryosphere: Earth's Frozen Assets*, NASA, https://www.nasa.gov/centers/goddard/earthandsun/climate_change.html (last visited Mar. 20, 2019); *see also* FLANNERY, *supra* note 150, at 26.

647. *See What Are Climate Change Feedback Loops?*, GUARDIAN, https://www.theguardian.com/environment/2011/jan/05/climate-change-feedback-loops (last updated Jan. 5, 2011).

648. *Id.*

649. *See* FLANNERY, *supra* note 150, at 28.

warms the atmosphere further.[650] The heat energy derived from evaporation carries a large amount of water vapor into the atmosphere.[651] This latent heat of water produces hurricane formations because the latent heat is liberated when massive quantities of water vapor rapidly condense.[652] As a result, hurricanes and other weather-related disasters cause extraordinary costs to the human population worldwide.[653]

It has been calculated that 90% of this additional heat energy is absorbed by the oceans.[654] When the oceans absorb this excess heat, it becomes increasingly more difficult for winds to mix the surface layers with the deeper layers—so the oceans settle into layers, or stratify.[655] Without an infusion of fresh carbonate-rich water from below, the surface water saturates with CO_2.[656] This stagnant water also supports fewer phytoplankton, so CO_2 uptake from photosynthesis slows.[657] In short, "stratification cuts down the amount of CO_2 the ocean can take up."[658] That is, the increase of oceanic CO_2 is reducing the amount of carbonate in the world's oceans, and, as the oceans become more acidic, the ocean loses its ability to hold

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650. *Id.*

651. *Id.*

652. *Id.*

> In the wake of hurricanes come floods, and in the wake of floods comes plagues. Cholera breeds in stagnant and polluted water, and mosquitoes that can spread malaria, yellow fever, dengue fever, and encephalitis proliferate. Plague can benefit from the disturbance as fleas, rats, and humans are brought into close proximity as they crowd together on higher ground. *Id.* at 50.

653. *See* Stephen Leahy, *Hidden Costs of Climate Change Running Hundreds of Billions a Year*, NAT'L GEOGRAPHIC (Sept. 27, 2017), https://news.nationalgeographic.com/2017/09/climate-change-costs-us-economy-billions-report/ (explaining that 2017 was the most expensive year on record for natural disasters in the United States—$306 billion).

654. *See* LuAnn Dahlman, *Climate Change: Ocean Heat Content*, CLIMATE.GOV (Aug. 1, 2018), https://www.climate.gov/news-features/understanding-climate/climate-change-ocean-heat-content.

655. *See* John Abraham, *Scientists Study Ocean Absorption of Human Carbon Pollution: Knowing the Rate at Which the Oceans Absorb Carbon Pollution is a Key to Understanding How Fast Climate Change Will Occur*, GUARDIAN (Feb. 16, 2017), https://www.theguardian.com/environment/climate-consensus-97-per-cent/2017/feb/16/scientists-study-ocean-absorption-of-human-carbon-pollution.

656. *Id.* Carbonate is used in the names of some substances that are formed from carbonic acid, which is a compound of carbon dioxide and water. *See Carbonic Acid and Carbonate Salts*, ENCYCLOPEDIA BRITANNICA, https://www.britannica.com/science/oxyacid/Carbonic-acid-and-carbonate-salts (last visited Mar. 20, 2019).

657. *See* Riebeek, *supra* note 157.

658. *Id.*

as much CO_2—which is then transferred back into the atmosphere.[659] Thus, because it is unequivocal that the atmosphere and climate are inextricably entwined with the oceans, the Hansen team concentrated their research primarily on measuring Earth's oceans.

C. How Did the Hansen Team Arrive at the 350 ppm Number?

Since over 90% of the extra heat ends up in the oceans, the Hansen team concluded that the most important measurements of global warming must be made in the oceans.[660] Thus, the Hansen team focused their research on a quantitative assessment in measuring Earth's energy imbalance by measuring the heat content of the Earth's largest heat reservoirs—the oceans.[661] Specifically, the Hansen team measured, via satellite and Google technology, the chemical composition and heat of the Earth's oceans by setting up thousands of "Argo floats," distributed in scattered locations around the globe (*see* Figure A.5).[662] In short, these Argo Floats revealed that the upper half of the ocean is gaining heat at a substantial rate caused by absorbing more than 90% of the excess heat energy generated by fossil fuel consumption.[663]

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659. *Id.*

660. Hansen et al., *supra* note 20, at 8.

661. *Id.*; *see also* John Abraham, *Earth's Oceans Are Warming 13% Faster Than Thought, and Accelerating*, GUARDIAN (Mar. 10, 2017), https://www.theguardian.com/environment/climate-consensus-97-per-cent/2017/mar/10/earths-oceans-are-warming-13-faster-than-thought-and-accelerating.

662. Hansen et al., *supra* note 20, at 8. To track the Argo floats in real time, *see Argo: Part of the Integrated Global Observation Strategy*, ARGO.UCSD.EDU, http://www.argo.ucsd.edu (last updated July 9, 2018).

663. *See* Hansen et al., *supra* note 20, at 8–9; *see also Latest Ocean Warming Review Reveals Extent of Impacts on Nature and Humans*, INT'L UNION FOR CONSERVATION OF NATURE (Sept. 5, 2016), https://www.iucn.org/news/secretariat/201609/latest-ocean-warming-review-reveals-extent-impacts-nature-and-humans.

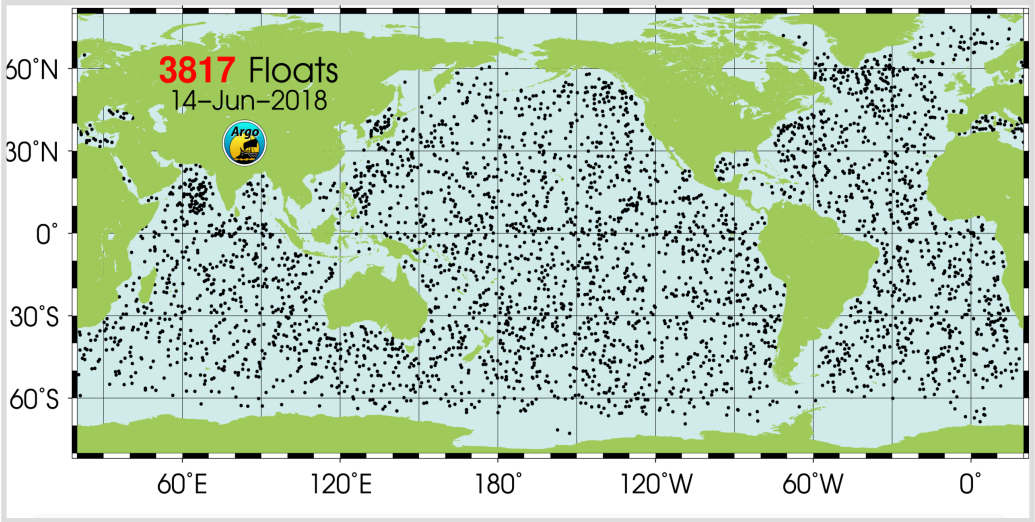

Figure A.5 Picture shows the placements of 3817 Argo Floats as of June 14, 2018.[664]

Due to the redundancy in testing and the high accuracy in gauging temperature and identifying chemical composition, the experimentation resulted in high confidence science. A source of uncertainty, however, was instrumental in nature, relating to the measurement process and methodological choices, including gaps in sampling and data coverage.[665] However, in the past decade, improvements have been made to reduce the sampling errors by using various methodologies.[666] Today, coverage has now reached over 90% of the world's oceans—reaching depths of over a mile (thus covering the majority of the ocean depths)—ensuring data accuracy, and reduction in systematic measurement errors.[667]

The Hansen team sought to eliminate another source of uncertainty by examining whether the sun's intensity, or any other possible heat variable, is causing the acceleration of Earth's temperature increase.[668] The Hansen team used a process of elimination by

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664. *See Argo*, *supra* note 200.

665. Hansen et al., *supra* note 20, at 8.

666. Lijing Cheng et. al., *Improved Estimates of Ocean Heat Content from 1960 to 2015*, SCI. ADVANCES (Mar. 10, 2017), http://advances.sciencemag.org/content/3/3/e1601545.full.

667. *See id.*

668. James Hansen et. al., *Young People's Burden: Requirement of Negative CO_2 Emissions*, EARTH SYS. DYNAMICS DISCUSSIONS (Oct. 4, 2016), https://www.earth-syst-dynam-discuss.net/esd-2016-42/esd-2016-42.pdf (referencing, *inter alia*, the insignificant effects of solar cycle influence, El Niño/La Niña oscillations, and other feedback phenomenon on observed global warming since the Industrial Revolution).

combining the known variables of heat sources and reducing them to a single variable.[669] These known variables include a set of cycles called Milankovitch cycles.[670] One cycle includes the Earth's ellipse around the sun, which changes on a 100,000-year cycle, known as Earth's eccentricity.[671] Another cycle, every 41,000 years, is caused by the tilt of the Earth on its axis.[672] The third cycle, every 19,000-23,000 years, is caused by the wobble of the Earth on its axis.[673]

Coupled with the data produced by the IPCC, the Hansen team's research produced results of high confidence within the climate science field. The Hansen team uncovered that the measured energy imbalance occurred "during the strongest solar minimum on record"[674]—meaning that the sun's energy reaching the Earth is at its least powerful.[675] So, since there is more energy staying in than going out, the Hansen team safely inferred that the effect of the sun's variation on climate is being overwhelmed by an alternative heating source.[676]

In addition to confirming what has already been long documented—that CO_2 concentration levels and the heat of the Earth are inextricably entwined—the Hansen team observed that the linear growth of temperature is reached after an exponential growth of atmospheric CO_2 heat-absorption.[677] Simply put, CO_2 warms the climate logarithmically due to the positive feedback loop process.[678] So, for the Hansen team to accurately measure the stable state of climate equilibria, they were left with formulating logarithmic calculations to

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669. *Id.*

670. *See* Christopher J. Campisano, *Milankovitch Cycles, Paleoclimatic Change, and Hominin Evolution*, NATURE EDUC. KNOWLEDGE PROJECT (2012), https://www.nature.com/scitable/knowledge/library/milankovitch-cycles-paleoclimatic-change-and-hominin-evolution-68244581 (last visited Mar. 20, 2019).

671. *Id.*

672. *Id.*

673. *Id.*

674. Hansen et al., *supra* note 20, at 9.

675. *See* Tony Phillips, *Deep Solar Minimum*, NASA: SCIENCE BETA (Apr. 1, 2009), https://science.nasa.gov/science-news/science-at-nasa/2009/01apr_deepsolarminimum.

676. Hansen et al., *supra* note 20, at 15.

677. *Id.*

678. *Id.* at 13.

measure climate inertia and thus pinpoint the heat energy at which the climate system reaches a stable state.[679]

These calculations led the Hansen team to conclude that Earth is out of energy balance by ~0.5 W/m^2.[680] The Hansen team explained that ~0.5 W/m^2, although a seemingly insignificant figure on its face, is equivalent to over 400,000 Hiroshima atomic bombs exploding each day—every day of the year.[681] In turn, the heat energy imbalance calculations enabled the Hansen team to accurately deduce how much CO_2 must be reduced to restore energy balance to reach a stabilized climate system.[682] Moreover, the Hansen team, through the use of climate models, determined that 350 ppm is the level of atmospheric CO_2 at which equilibrium may be reached.[683]

From there, the Hansen team prescribed what is mathematically necessary to return to equilibrium at 350 ppm.[684] That is, assuming all other nations commit to the COP23 agreements and no abnormal shocks are entered into the system, and that the United States phases out fossil fuel consumption at a rate of 8% per year starting in 2017 and implements either a geo-engineering approach or a more plausible reforestation approach; then atmospheric CO_2 concentrations may reach 350 ppm by the year 2100 (*see* Figure A.6).[685]

Essentially, the Hansen team's graph simulates the way the atmosphere is behaving and provides mathematically-based predictions that indicate how it will behave in the future. In other words, the graph represents the current trend of CO_2 ppm concentrations in the atmosphere and predicts future CO_2 reduction based on strict conformity to the Hansen team's climate recovery plan. The Hansen team's figure also shows that the course of climate

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679. *See generally id.* at 14.

680. *See generally id.* at 15. W/m^2 stands for watts per square meter.

681. James Hansen, *Why I Must Speak Out About Climate Change*, TED TALK (Feb. 2012), https://www.ted.com/talks/james_hansen_why_i_must_speak_out_about_climate_change.

682. James Hansen et al., *Earth's Energy Imbalance*, NASA (Jan. 2012), https://www.giss.nasa.gov/research/briefs/hansen_16/.

683. Hansen et al., *supra* note 20, at 9.

684. *Id.*

685. Hansen et al., *supra* note 20, at 12. COP23 was organized by Climate Action, UN Environment, and UNFCCC which took place in 2015 in Bonn, Germany. *See COP23 Bonn Germany: Sustainable Innovation Forum 2017*, U.N., http://www.cop-23.org/ (last visited Mar. 20, 2019). This event included governments, cities, and regions from the 152 countries that have ratified the Paris Agreement, which agreed that they must now meet their national climate change commitments. *See id.*

change is set for the next few decades—regardless of what action is taken—because the greenhouse gases are already in the atmosphere, with a lag in effect. And, right now, there is no viable means of getting it out.[686] This means that the course of climate change is set for at least the next several decades.[687] More specifically, the full impact of the greenhouse gases already in the atmosphere will not be experienced until around 2050.[688] Because we lack an economically efficient way to capture greenhouse gases out of the atmosphere, this decades-long period of lag is considered a true physical commitment due to the long life of CO_2 in the atmosphere.[689]

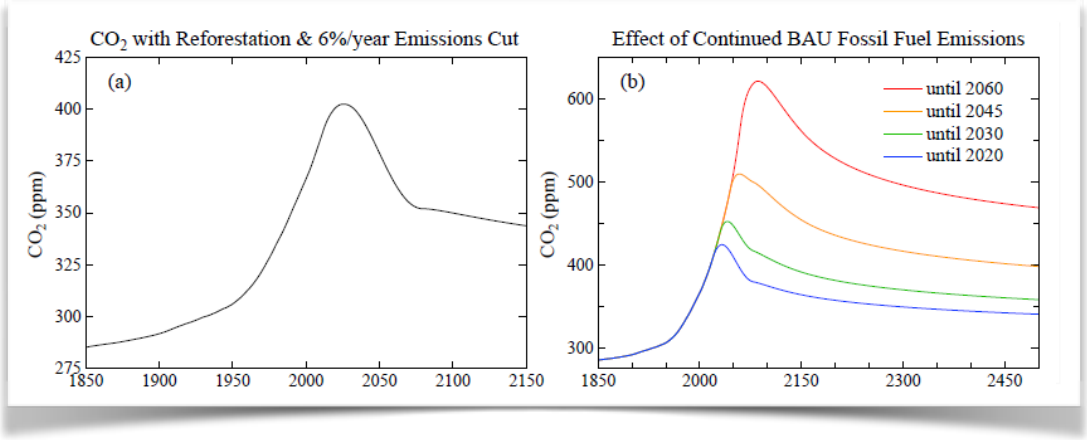

Figure A.6 Projected CO_2 reduction rate to reach 350 ppm by 2100.

Note: The Hansen team explained that this graph shows that if global CO_2 emissions peak and reductions begin in 2017, the annual rate of reduction will be 8% per year alongside 100 GtC (gigatons of carbon) of global reforestation throughout the century.[690] However, if emission reductions do not begin until 2020, a 15% per year reduction rate will be required to reach 350 ppm by 2100.[691] If reductions are delayed beyond 2020, it might not be possible to return to 350 ppm until well after 2500.[692]

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686. *See* Peter Wadhams, *Saving the World with Carbon Dioxide Removal*, WASH. POST (Jan. 8, 2018), https://www.washingtonpost.com/news/theworldpost/wp/2018/01/08/carbon-emissions/?utm_term=.ea608a301e371 ("At the moment, most methods cost more than $100 per ton, but there are dramatic developments which promise great improvement.").

687. Hansen et al., *supra* note 20, at 13.

688. *See id* at 10.

689. *Understanding Global Warming Potentials*, *supra* note 143.

690. Hansen et al., *supra* note 20, at 12.

691. *Id.*

692. *Id.*

Overall, the science produced by the Hansen team is statistically significant, indicating high confidence calculations. The multiple scenarios that define the rate at which fossil fuel emissions must be phased down to restore Earth's energy balance and stabilize the global climate system are both falsifiable and mathematically precise.[693] Redundant methodology, via thousands of Argo Floats, provides the basis for which logarithmic calculations can be made and retested. With the completion of a 90% distribution of Argo Floats throughout the oceans, coupled with a reduction of calibration problems, it is confirmed that the Earth's heat energy imbalance assures increasing climate impacts.[694]

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693. *See supra* Table 1:1.

694. In turn, type I errors are greatly minimized due to the high level of significance afforded to these measurement calculations. *See* Courtney Taylor, *What Level of Alpha Determines Statistical Significance?*, THOUGHTCO. https://www.thoughtco.com/what-level-of-alpha-determines-significance-3126422 (last updated June 25, 2018). Thus, the maximum probability that the Hansen team encounters a type I error (rejecting an alternative hypothesis when that alternative hypothesis was actually true) in their prediction is significantly low, and, as a result, there is high probability that a type II error (rejecting the conclusion of their tested hypothesis when that conclusion was actually true) will occur if the prescription is not followed. *Id.*

Appendix B: Table (B.1) of 113 NEPA Climate Challenges, 2015-2019[695]

Case Caption, Court, & Year	On-Point NEPA Climate Challenge	Alleged Agency NEPA Violations
Friends of Cedar Mesa v. U.S. Department of the Interior D. Utah	Southern Utah Wilderness Alliance challenged BLM's oil and gas lease sales covering more than 54,000 acres near national monuments in southeastern Utah, including: Bears Ears, Canyons of the Ancients, and	BLM failed to take a hard look at the direct, indirect, and cumulative impacts of its action on the emissions of methane and nitrous oxide, fugitive emissions from pipeline leaks, and the reasonably foreseeable impacts on climate change.
Farm Sanctuary v. U.S. Department of Agriculture W.D.N.Y. 2019	Seven nonprofit organizations Challenge U.S. Department of Agriculture's (USDA's) final rule establishing an optional new inspection system for hog slaughter.	USDA failed to take a hard look by analyzing the impact of increased demand on pig slaughter on increases in emissions of nitrous oxide and methane and on cumulative impacts on climate change at specific concentrated animal feeding operations before determining that the final rule was categorically excluded from NEPA review.
Center for Biological Diversity v. U.S. Bureau of Land Management N.D. Cal. 2019	Center for Biological Diversity and Sierra Club challenged BLM's approval of a resource management plan amendment for a planning area that that would make 725,500 acres of public lands available for oil and gas leasing on the California's Bay Area and	BLM failed to altogether consider the impacts of oil and gas development on greenhouse gas emission and climate change.

[695]. *See generally* Sabin Center for Climate Change Law, *U.S. Climate Change Litigation*, http://climatecasechart.com/us-climate-change-litigation/.

Utah Physicians for a Healthy Environment v. U.S. Bureau of Land Management D. Utah	Six environmental and conservation organizations challenged BLM's review for federal coal lease on public land near Bryce Canyon National Park, Utah, which enabled an existing coal mine on private lands to expand to include federal lands.	BLM failed to take a hard look by using the best available science and tools and to consider the direct and indirect impacts from greenhouse gas emissions impacts associated with the mine and the cumulative climate impacts together with other coal mining projects.
Columbia Riverkeeper v. U.S. Army Corps of Engineers W.D. Wash. 2019	Five organizations Challenge U.S. Corps of Engineers (USACE) issuance of a Section 404 permit for a maritime export terminal planned to work as a methanol facility on the Columbia River, in Kalama, Washington.	USACE failed to take a hard look by considering the project's direct, indirect, and cumulative impacts on climate change.
Center for Biological Diversity v. Suazo D. Ariz. 2019	Three environmental groups challenge the BLM's issuance of oil and gas leases covering land in Arizona, within the Navajo Nation, Petrified Forest National Park, the Coconino Aquifer, and the Little Colorado	BLM failed to take a hard look by relying on the best available science and instead improperly relied on 30-year-old environmental analysis that did not anticipate oil and gas development or consider significant new information about oil and gas technologies and climate change.
Center for Biological Diversity v. Bernhardt D. Colo. 2019	Center for Biological Diversity and two other groups challenge the BLM's approval of a resource management plan in western Colorado, making 935,600 acres available for oil and gas leasing with 3,940 wells projected to be drilled.	BLM failed to consider alternatives to oil and gas leasing and development and to take a hard look by addressing foreseeable indirect impacts from downstream combustion of oil and gas resources and by considering cumulative effects to the climate caused by foreseeable oil and gas production under the plan in combination with BLM's nationwide public lands oil and gas

Save the Scenic Santa Ritas v. U.S. Army Corps of Engineers D. Ariz. 04/10/2019	Three Native tribes challenged the USACE's Section 404 permit, which granted a mining company prefilling for all washes on a copper mine site in Arizona with native material.	USACE failed to take a hard look by considering the cumulative effects of climate change.
WildEarth Guardians v. Bernhardt D. Colo. 2019	Five environmental groups Challenge U.S. Department of the Interior's (DOI's) approval of a mining plan for the 1,720-acre expansion of the West Elk Coal Mine in western Colorado.	DOI failed to consider alternatives that would reduce or offset methane pollution associated with coal mining and failed to take a hard look at the cumulative impacts of climate change in conjunction with other similar federal coal approvals and proposals and in light of new climate science and information.
Save the Colorado v. U.S. Department of the Interior D. Ariz.	Three conservation groups challenge DOI's plan for managing the Glen Canyon Dam.	DOI failed to consider alternatives failed to take a hard look by analyzing the cumulative and indirect impacts caused by climate change and provide a supplemental EIS with recently published scientific research on climate change impacts on the Colorado River.
Center for Biological Diversity v. Bernhardt N.D. Cal. 2019	Seven environmental organizations challenged the U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) for amendments made to the Endangered Species Act (ESA) regulations, which revised the definition of "foreseeable future" to impose an increased certainty requirement for species	FWS and NMFS failed to take a hard look by considering the cumulative impacts of climate change, which will cause species facing extinction from the impacts of climate change to be improperly deprived of protection until after it is too late to prevent their extinction and failed the to rely on the best available science.

Oregon Natural Desert Association v. Hanley D. Or. 2019	Three conservation groups challenge BLM's decision to reverse and abandon a provision of the 2015 conservation plan for the greater sage-grouse in Oregon by closing approximately 22,000 acres to livestock grazing.	BLM failed to failed to altogether consider the impact of the plan amendment on climate change, including areas within BLM-identified Climate Change Conservation Areas.
Living Rivers v. Bernhardt D. Utah 2019	Environmental and conservation groups challenged the DOI and BLM's approval of rights-of-way enabling construction and operation of commercial-scale oil-shale mine and processing plant.	DOI and BLM failed to take a hard look by considering the climate impacts of end-use combustion of synthetic oil carried by the pipeline project.
Diné Citizens Against Ruining the Environment v. Bernhardt D.N.M.	Four environmental groups challenge the BLM's approval of over 250 applications for permits to drill for oil and gas in Mancos Shale/Gallup formations in New Mexico.	BLM failed to take a hard look by considering the impact of continued expansion and the increased methane emissions and failed to consider the cumulative impacts of oil and gas production in the Mancos Shale.
Northern Plains Resource Council v. U.S. Army Corps of Engineers D. Mont.	Environmental and conservation groups challenged the USACE's approval of the Keystone XL pipeline using Nationwide Permit 12, a general permit issued for pipelines and other utility projects.	USACE failed to take a hard look by evaluating the indirect and cumulative effects of lifecycle greenhouse gas emissions caused by projects authorized under Nationwide Permit 12.

Natural Resources Defense Council v. McCarthy D. Utah 2019	Environmental and conservation groups challenged the BLM's decision to lift a 12-year-old ban on cross-country off-highway vehicle (OHV) travel on 5,400 acres of public lands east of the entrance to Capitol Reef	BLM failed to altogether consider the impacts of its decision to lift the ban and climate change, including consideration of aridification combined with land uses that increase dust emissions which have synergistic and significant consequences.
350 Montana v. Bernhardt D. Mont. 2019	Environmental groups challenged the DOI re-approval of mining plan modification allowing expansion of the Bull Mountains Mine, which is an underground coal mine in Montana.	DOI failed to consider alternatives, including replacing the mine with renewable resources, and to take a hard look at the impact of expansion and indirect and cumulative, which would cost the public billions of dollars, far greater than the economic benefits of the mine.
Center for Biological Diversity v. EPA N.D. Cal. 2019	The Center for Biological Diversity challenged the U.S. Environmental Protection Agency's (EPA's) granting of a Safe Drinking Water Act exemption, which would allow the injection of oil and gas wastewater in the Arroyo Grande Oil Field in San Luis Obispo County, California.	EPA failed to altogether consider the impacts of expanding injections and oil production in exacerbating the climate crisis.
United States Sugar Corp. v. Semonite S.D. Fla. 2019	The United States Sugar Corporation challenged the USACE's decision to release drought-level amounts of water from Lake Okeechobee in Florida.	USACE failed to altogether consider the impacts of its decision and climate change before releasing water from Lake Okeechobee, including the Corps' development of additional science regarding risks from climate change.

Montana Environmental Information Center v. Bernhardt D. Mont. 2019	Five organizations challenged the DOI's approval of the expansion of the Rosebud coal strip-mine in Colstrip, Montana.	DOI failed to consider a reasonable range of alternatives, including a "middle-ground alternative that involved mining less coal", and failed to take a hard look by considering the indirect and cumulative impacts on increased emissions from combustion of the mined coal.
Center for Biological Diversity v. U.S. Army Corps of Engineers S.D. Fla.	Three environmental organizations challenged the USACE decision to release unmitigated releases of Lake Okeechobee water into the Caloosahatchee and St. Lucie rivers and estuaries.	USACE failed to take a hard look by considering how climate change might impact Downstream Waters from Lake Okeechobee and harmful algal blooms and by failing to supplement its NEPA analysis with the best available science regarding climate change impacts and toxic algae.
California v. Chao D.D.C. 2019	California, twenty-three other states, the District of Columbia, New York City, and Los Angeles challenged the EPA and U.S. Department of Transportation (USDOT), National Highway Traffic Safety Administration's (NHTSA) final rule preempting state regulation, which withdrew the waiver that allowed California to promulgate greenhouse gas standards for vehicles.	EPA, USDOT, and NHTSA altogether failed to consider the impacts of their decision on increasing greenhouse gas emissions and exacerbating climate change.
Center for Biological Diversity v. U.S. Department of the Interior D.D.C.	Four environmental groups challenged the Bureau of Reclamation's (BOR) issuance of a contract allowing new water extractions from the Green River and the Colorado River Basin.	BOR failed to consider a reasonable range of alternatives, failed to take a hard look at indirect and cumulative impacts of climate change, including the prediction that "with strong certainty to decrease stream flows" and by failing to rely on the best available science, but instead used a modeling run that ignored the effects of climate change on water

Klamath-Siskiyou Wildlands Center v. U.S. Bureau of Land Management D. Or. 2019	Four environmental groups challenged the BLM's approval of the first project prepared by the Lakeview District in the Klamath Falls Resource Area in Oregon under a 2016 resource management plan, which allowed additional timber harvest from BLM-managed lands in Oregon.	BLM failed to altogether consider the impacts of the land management project on climate change and wildfire risk, which fire season has become "longer and more unpredictable" because the effects of climate change.
Rocky Mountain Wild v. Bernhardt D. Colo. 2019	Four environmental groups challenged the BLM's decisions to issue 59 oil and gas leases covering 61,910.92 acres in northeast Utah.	BLM failed to take a hard look by considering the cumulative climate change impacts caused by oil and gas leases.
California v. Bernhardt N.D. Cal. 2019	Seventeen states, the District of Columbia, and New York City challenge DOI amendments to the regulations implemented in the Endangered Species Act.	DOI failed to altogether consider the impacts of its decision on climate change with the imperiled species and critical habitat, including by limiting designation of unoccupied critical habitat, "particularly where climate change poses a threat to species habitat."
Healthy Gulf v. Bernhardt D.D.C. 2019	Three environmental groups challenged the DOI and Bureau of Ocean Energy Management's (BOEM) decision to hold an oil and gas lease sale in the Gulf of Mexico (Lease Sale 252).	DOI and BOEM failed to take a hard look by considering the cumulative impacts of oil and gas activities in the Gulf of Mexico, including the contribution to climate change due to greenhouse gases emitted by exploration, development, and production operations and due to the burning of the oil and gas produced in the

Harrison County v. Mississippi River Commission S.D. Miss. 2019	Three Mississippi cities, two counties, and two organizations representing the Mississippi lodging and tourism and commercial fishing industries challenged the USACE's decision to open the Bonnet Carré Spillway, which released a flood of polluted Mississippi River water through the Lake Pontchartrain Basin and into the Mississippi Sound, wreaking havoc on the natural resources, communities and businesses on the Mississippi Gulf	USACE failed to altogether consider the impact of its decision on climate change and increased flooding and precipitation, despite detailing that "[t]his increased precipitation will continue as a consequence of warming temperatures."
WildEarth Guardians v. Bernhardt D.N.M. 2019	WildEarth Guardians challenged the BLM's decision to issue 210 oil and gas leases covering 68,232.94 acres of land in New Mexico, in BLM's Pecos District.	BLM failed to take a hard look at the direct, indirect, and cumulative impacts of climate change.
Earth Island Institute v. Nash N.D. Cal. 2019	Earth Island Institute, Sequoia Forestkeeper, Greenpeace, and climate scientist James Hansen challenged the U.S. Department of Housing and Urban Development (HUD) and the USFS's authorization for a logging project and biomass power plant on public forestland burned during the Rim Fire in 2013,	HUD and USFS failed to take a hard look by considering the direct, indirect, and cumulative impacts of logging for biomass energy production and increased greenhouse gas emissions; and by failing to use best available science by supplementing EISs to include new information about the rim fire and the forest's natural regeneration and climate change.

North Carolina Wildlife Federation v. North Carolina Department of Transportation E.D.N.C. 2019	North Carolina conservation organization and a local citizen group challenged the DOT's approvals for a toll bridge in the Currituck Outer Banks, in North Carolina.	DOT failed to provide public review of the project; failed to consider alternatives; failed to take a hard look at the direct, indirect, and cumulative impact and by failing to supplement its EIS with the best available science, including up-to-date sea level projections; recent observed and projected increases in storm surge magnitude; intensifying hurricanes; and marsh migration.
Hosemann v. U.S. Army Corps of Engineers S.D. Miss. 2019	Lawsuit Mississippi Secretary of State challenged the USACE's most recent dam release decision tied to a decades-long effort to keep the Mississippi in its current channel flowing past Baton Rouge and New Orleans.	USACE failed to altogether consider the impacts of its decision of climate change.
Western Watersheds Project v. Bernhardt D. Or. 2019	Three conservation groups challenged the DOI and BLM's renewal of grazing permits to a family-owned Oregon ranching corporation whose officers had been convicted of intentionally setting fires on public lands and were later pardoned by President Trump.	DOI and BLM failed to take a hard look by considering the proposed grazing's indirect and cumulative impacts in combination with climate change and the effects of climate change and fire. and failure to use best available science regarding climate change causing increased temperatures.
Living Rivers v. Hoffman D. Utah 2019	Three conservation groups challenge the BLM for issuing 130 oil and gas lease sales covering 175,357 acres of public lands in Utah.	BLM failed to take a hard look by considering direct (downstream emissions for non-carbon dioxide emissions and emissions that occurred after drilling but prior to combustion) indirect (other than carbon dioxide emissions from combustion) and cumulative (failed to quantify cumulative emissions of other past, present, or reasonably foreseeable oil and gas lease sales) greenhouse gas emissions and

Gulf Restoration Network v. Zinke D.D.C. 2018	Gulf Restoration Network, Sierra Club, and Center for Biological Diversity challenge DOI decisions to hold offshore oil and gas lease sales in the Gulf of Mexico.	DOI failed to take a hard look by considering the direct, indirect, and cumulative impacts of oil and gas development in the Gulf contributes significantly to climate change through emissions emitted by exploration, development, and production operations, as well as downstream combustion.
Birckhead v. Federal Energy Regulatory Commission D.C. Cir. 2018	Birckhead challenged Federal Energy Regulatory Commission's (FERC) approval of a project involving construction and replacement of natural gas compression facilities in West Virginia, Kentucky, and Tennessee.	FERC failed to adequately assess alternative sites for the project and to take a hard look use best available science required to determine that greenhouse gas emissions as reasonably foreseeable indirect effect of the project and failed to consider upstream gas production and downstream gas combustion, concluding that such impacts did not qualify as indirect effects of the project.
Delaware Riverkeeper Network v. Federal Energy Regulatory Commission D.C. Cir. 2018	Delaware River Keeper Network challenged FERC's approvals of the PennEast Project, which includes a 116-mile natural gas pipeline from Pennsylvania to New Jersey, three lateral pipelines, a compression station, and appurtenant aboveground facilities.	FERC failed to altogether consider the impacts of greenhouse gas emissions and impacts on climate change.
Rocky Mountain Wild v. Zinke D. Colo. 2018	Four conservation groups challenged BLM’s approval of 121 oil and gas leases covering 117,720.59 acres in and around the Uinta Basin in northwestern Colorado and northeastern Utah, near Dinosaur National	BLM failed to take a hard look at the cumulative climate impacts in conjunction with other past, present, and future lease sales in the Uinta Basin.

Dakota Rural Action v. U.S. Department of Agriculture D.D.C. 2018	Dakota Rural Action challenged the U.S. Department of Agriculture Farm Service Agency (FSA) rule that categorically excluded FSA funding of medium-sized concentrated animal feeding operations from NEPA review.	FSA altogether failed to prepare an environmental assessment before it promulgated a final rule for categorical exclusion.
Northern Alaska Environmental Center v. U.S. Department of the Interior D. Alaska 2018	Five environmental groups challenged DOI and BLM's decision to lease lands (approximately 10.3 million acres) for oil and gas drilling in the National Petroleum Reserve, Alaska.	DOI and BLM altogether failed to prepare either an environmental assessment or environmental impact statement before conducting an oil and gas lease sale for approximately 10.3 million acres in the Reserve, in addition to failing to complete a site-specific environmental analysis by taking a hard look at direct, indirect, and cumulative impacts including contributions to
California v. Zinke N.D. Cal. 2018	California and New Mexico Challenge BLM's repeal of provisions of the 2016 Waste Prevention Rule for oil and gas development on public and tribal lands.	BLM failed to offer a reasoned explanation and was arbitrary in not basing its decision on best available science and altogether failed to consider the impact of the repeal would have on climate change.
Save the Colorado v. Semonite D. Colo. 2018	Several environmental groups challenged USACE's authorization of the construction and operation of the tallest dam in Colorado history, in Boulder County.	USACE failed to take a hard look at the direct, indirect, and cumulative impacts on and failed to consider the best available science in future climate change models.

Natural Resources Defense Council, Inc. v. Zinke D. Alaska 2018	Natural Resources Defense Council, Inc. and three other environmental groups Challenge BLM oil and gas lease sale in the National Petroleum Reserve, Alaska.	BLM failed to altogether consider the impacts on the lease sales in the National Petroleum Reserve on greenhouse gas emissions and climate change.
Rosebud Sioux Tribe v. U.S. Department of State D. Mont. 2018	Rosebud Sioux Tribe and Fort Belknap Indian Community challenge the U.S. Department of State (DOS)'s presidential permit for the Keystone XL Pipeline.	DOS failed to altogether consider the impacts that the pipeline would have on greenhouse gasses and climate change.
Sound Rivers, Inc. v. U.S. Fish & Wildlife Service E.D.N.C. 2018	Sound Rivers challenged FWS approval of a highway through Piedmont North Carolina.	FWS failed to altogether consider greenhouse gas emissions and climate change, with the new federal rule "freezing" CAFE standards.
Martin County, Florida v. U.S. Department of Transportation D.D.C. 2018	Two Florida counties, a county emergency services district, and non-profit citizens group challenged the DOT's allocation for tax-exempt private activity bonds for passenger railroad between Miami and Orlando, in Florida.	DOT failed to take a hard look at the impacts of its decision on the direct, indirect and cumulative impacts on greenhouse gas emissions and climate change, especially regarding the impacts from sea level rise.

Center for Biological Diversity v. Tennessee Valley Authority N.D. Ala. 2018	Five environmental groups challenged the Tennessee Valley Authority's (TVA's) new rate structure which discourages investing in renewable energy (especially solar) and energy efficiency.	TVA failed to altogether consider the effects of power production on greenhouse gases and climate change.
Appalachian Voices v. Federal Energy Regulatory Commission 4th Cir. 2018	Citizen groups challenged FERC's approval of the Atlantic Coast pipeline, a 604-mile gas pipeline extending from West Virginia to North Carolina.	FERC failed to take a hard look by adequately assessing the direct, indirect, and cumulative impacts of greenhouse gas emissions and climate change.
Bark v. U.S. Forest Service D. Or. 2018	Bark challenged USFS's approval of a forest thinning project in the Mount Hood National Forest.	USFS failed to take a hard look at the climate change effects of a forest thinning project by failing to analyze impacts of particular project and it did not incorporate information from public comments, including a formula for assessing the carbon impacts of timber
Wilderness Workshop v. U.S. Bureau of Land Management D. Colo. 2018	Five environmental groups challenged the BLM's approval and lease auctions of fifty-three oil and gas lease parcels on public lands in the Upper Colorado River Basin in western Colorado.	BLM failed to take a hard look at direct, indirect, and cumulative greenhouse gas emissions and climate change effects and relied on outdated science with respect to methane's global warming potential, which resulted in understating the magnitude of impacts.

Atchafalaya Basinkeeper v. U.S. Army Corps of Engineers M. D. LA. 2018	Six organizations challenged USACE's permits and authorizations for the Bayou Bridge Pipeline, a 162.5-mile-long crude oil pipeline from Lake Charles, Louisiana, to St. James, Louisiana.	USACE failed to take a hard look by assessing the cumulative impacts, including 'locking in' future reliance on fossil fuels with a massive infrastructure investment.
WildEarth Guardians v. U.S. Bureau of Land Management D. Mont. 2018	Two environmental groups, a Montana landowner, and the owners of an orchard in Montana challenged the BLM's environmental reviews conducted for oil and gas lease sales on approximately 150,000 acres of public lands in Montana.	BLM failed to take a hard look at direct, indirect, and cumulative impacts of greenhouse gasses and climate change and failed to apply best available science to adequately quantify cumulative emissions and failed to provide information to the public or make informed choices between alternatives.
Klamath-Siskiyou Wildlands Center v. Grantham E.D. Cal. 2018	Three environmental groups challenged USFS plans to clear-cut old forests to reduce risks of wildfire in the Johnny O'Neil Late-Successional Old Growth Forest Reserve.	USFS failed to take a hard look by considering the best available science, which indicates that future wildfires are made worse by extensive logging that removes all of the largest fire-affected trees from an area.
Norwalk Harbor Keeper v. U.S. Department of Transportation D. Conn.	Norwalk Harbor Keeper challenged DOT's review for railroad bridge replacement project in Norwalk, Connecticut	DOT failed to take a hard look by considering reasonable alternatives, including a fixed bridge at the level of the existing swing bridge.

Western Watersheds Project v. Zinke D. Idaho 2018	Western Watersheds Project and Center for Biological Diversity challenged DOI and BLM's sale of hundreds of thousands of acres of oil and gas leases within and affecting sage-grouse habitat.	DOI and BLM failed to take a hard look at the direct, indirect, and cumulative impacts on climate change in relation to the sage-grouse and its habitat.
Idaho Conservation League v. U.S. Forest Service D. Idaho 2018	Two conservation groups challenged USFS approval of a mining exploration project in Idaho.	USFS failed to take a hard look at the direct, indirect, and cumulative impact of climate change in relation to the project and threats posed to whitebark pine, in addition to the threats of nonnative white pine blister rust, native mountain pine beetle, and fire suppression.
California v. U.S. Bureau of Land Management N.D. Cal. 2018	California challenged the BLM's decision to repeal 2015 regulations that govern hydraulic fracturing on federal and tribal lands.	BLM failed to altogether consider the impacts of climate change, in addition to other significant adverse environmental impacts.
Otsego 2000, Inc. v. Federal Energy Regulatory Commission D.C. Cir. 2018	A local environmental organization and a married couple challenged FERC's order authorizing the New Market Project, which includes an expansion of an existing natural gas compressor station on a site abutting the married couple's farm and home in New York.	FERC failed to take a hard look at the indirect and cumulative impacts of upstream and downstream greenhouse gas emissions from fossil fuel production and transportation projects.

Center for Biological Diversity v. Zinke 9th Cir. 2018	Five environmental groups challenged the BOEM and the FWS's authorization of the Liberty Project, an oil and gas development project in the Beaufort Sea offshore of Alaska.	BOEM and FWS failed to altogether consider the impact of the project on climate change.
Town of Weymouth v. Federal Energy Regulatory Commission D.C. Cir. 2018	Town of Weymouth challenged FERC's approval of the Atlantic Bridge Project, which included upgrades to existing natural gas pipeline and compression facilities in New York, Connecticut, and Massachusetts.	FERC failed to take a hard look at the project's indirect and cumulative impacts on greenhouse gas emissions and climate change, including quantifying the project's expected greenhouse-gas emissions and detailing how the project would interact with Massachusetts's climate change goals.
Citizens for a Healthy Community v. U.S. Bureau of Land Management D. Colo. 2018	Citizens for a Healthy Community challenged the BLM and USFS's authorization of an oil and gas development in the Bull Mountain Unit in the Colorado River basin.	The BLM and USFS failed to take a hard look by considering the foreseeable indirect effects resulting from combustion of oil and gas and the cumulative impacts on climate change; and by failed to rely on best available science and tools, by quantifying greenhouse gas emissions from the combustion of oil and natural gas.
Appalachian Voices v. Federal Energy Regulatory Commission D.C. Cir. 2017	Environmental groups challenging FERC's order authorizing the Mountain Valley Pipeline, a 303.5-mile gas pipeline extending from West Virginia to Virginia.	FERC failed to provide meaningful public involvement and failed to altogether consider the pipeline's climate impacts.

Sierra Club v. Federal Energy Regulatory Commission D.C. Cir. 2017	Sierra Club challenged FERC's approvals for the NEXUS pipeline, a 257-mile natural gas pipeline located between Ohio and Michigan.	FERC failed to altogether consider the effects of greenhouse gas emissions and climate change.
Save the Scenic Santa Ritas v. U.S. Forest Service D. Ariz. 2017	Environmental groups challenged USFS's approvals for a copper mine in Arizona.	USFS failed to take a hard look by considering the indirect and cumulative effects of the greenhouse gas emissions that would result from the smelting of the ore, along with other adverse effects in relation to groundwater drawdown and climate change had not been examined quantitatively, using the best available science.
Citizens for Clean Energy v. U.S. Department of Interior D. Mont. 2017	Seven environmental organizations and the Northern Cheyenne Tribe challenged DOI's and BLM's decisions to repeal the moratorium on federal coal leasing and to abandon an ongoing programmatic environmental review of the coal leasing program.	DOI and BLM failed to altogether consider the leasing program's impacts on climate caused by the burning of coal and failed to include best available science, new information about climate change since 1979—which requires the preparation of a supplemental programmatic EIS.
Bair v. California Department of Transportation N.D. Cal. 2017	Four individuals and four environmental groups challenged DOT's highway widening project in Richardson Grove State Park, the gateway to the old-growth redwoods along California's northern coast.	DOT failed to altogether consider and meaningfully evaluate the project's impacts on greenhouse gas emissions and climate change.

Indigenous Environmental Network v. U.S. Department of State D. Mont. 2017	Two groups representing indigenous peoples and conservation interests challenged the DOS's issuance of a presidential, cross-border permit, for the Keystone XL Pipeline.	DOS failed to failed to consider feasible and environmentally beneficial alternatives; to take a hard look by adequately disclosing climate impacts to the public; to consider the indirect and cumulative impact on climate change.
Atlantic Coast Pipeline, LLC v. Federal Energy Regulatory Commission D.C. Cir.	Environmental and community groups challenged FERC's approvals for the Atlantic Coast Pipeline, a natural gas pipeline project running through West Virginia, Virginia, and North Carolina.	FERC failed to take a hard look by adequately assessing the project's reasonably foreseeable direct, indirect, and cumulative greenhouse gas emissions and climate change impacts.
California v. U.S. Bureau of Land Management 9th Cir. 2017	California and New Mexico challenged the BLM's rule postponing compliance dates for Waste Prevention Rule for one year, which imposed requirements on oil and gas companies to reduce the venting, flaring, and leaking of natural gas, including the greenhouse gas methane, during production activities on onshore federal and Indian leases.	BLM failed to altogether consider the impacts of its action on climate change.
National Wildlife Federation v. U.S. Army Corps of Engineers D.D.C. 2017	Three environmental organizations challenged USACE's approval of an amendment to the Master Water Control Manual for federal dams and reservoirs in the Apalachicola-Chattahoochee-Flint River Basin	USACE failed to take a hard look by including reliance on best available science, instead relying on hydrological data that was inadequate in light of known, foreseeable, and anticipated changes in climate.

Center for Biological Diversity v. U.S. Forest Service S.D. Ohio	Four environmental organizations challenged the USFS and BLM's authorization of oil and gas leases in the Wayne National Forest.	USFS and BLM failed to take a hard look by relying on an outdated analyses that did not take into account significant new information, including the best available science, about climate change.
High Country Conservation Advocates v. U.S. Forest Service D. Colo. 2017	Five conservation groups challenged the USFS and BLM's approvals of an underground coal mine expansion in the Sunset Roadless Area, Colorado.	USFS and BLM failed to consider a reasonable alternatives aimed at mitigating methane pollution; to take a hard look at the indirect and cumulative impacts of the expansion on greenhouse gas and climate, including the increased demand for coal that the mine's expansion would induce; to disclose to the public the best available science, including using scientifically valid and
Regents of University of California v. Federal Emergency Management Agency N.D. Cal. 2017	The Regents of the University of California challenge the Federal Emergency Management Agency (FEMA) termination of wildfire mitigation grants for hazardous fire risk reduction in the East Bay Hills, California.	FEMA failed to take a hard look by preparing a supplemental EIS using the best available science.
General Land Office of State of Texas v. U.S. Fish & Wildlife Service W.D. Tex. 2017	General Land Office of State of Texas challenged FWS continued listing of golden-cheeked warbler as an endangered species, where the FWS found the warbler as still threatened by widespread destruction of its habitat.	FWS failed to altogether consider the impacts of its decision and climate change.

Delaware Riverkeeper Network v. U.S. Army Corps of Engineers 3d Cir. 2017	Maya van Rossum and Delaware Riverkeeper Network challenged USACE's issuance of a permit for a natural gas interstate pipeline project.	USACE failed to select an alternative that would avoid the more climate harming decision. *This challenge contains an erroneous argument. That is, there is no obligation for the government to select the less environmentally harmful alternative.
WildEarth Guardians v. Zinke D. Mont. 2017	WildEarth Guardians and Montana Environmental Information Center challenged DOI's mining plan modification and expansion for the Spring Creek Mine in southeastern Montana, the seventh largest coal strip-mine by production in the United States.	DOI failed to take a hard look by considering the indirect effects, particularly concerning coal transportation, air pollution and greenhouse gas pollution from coal combustion, and the cumulative impacts.
Allegheny Defense Project v. Federal Energy Regulatory Commission D.C. Cir. 2017	Environmental organizations challenged FERC's approval of the Atlantic Sunrise natural gas pipeline expansion project in Pennsylvania and other locations on East Coast.	FERC failed to take a hard look by considering the direct, indirect, including the impacts of shale gas drilling and downstream greenhouse gas emissions and cumulative impacts, by predicting that those emissions would be partially offset by reductions in higher carbon-emitting fuel that the project's natural gas would replace.
New York State Department of Environmental Conservation v. Federal Energy Regulatory Commission 2d Cir. 2017	New York State Department of Environmental Conservation challenged FERC's authorization for natural gas pipeline project in New York.	FERC failed to take a hard look by evaluating the indirect and cumulative impacts of the project's downstream greenhouse gas emissions and climate change; and to use best available science and to provide supplemental environmental review

In re: Border Infrastructure Environmental Litigation S.D. Cal. 2017	The People of the State of California and Its Coastal Commission challenged the Department of Homeland Security's (DHS) authorization and waiving review of requirements for two border wall projects in	The DHS failed to altogether consider the impacts of the projects' construction on greenhouse gas emissions and climate change.
Save the Colorado v. U.S. Bureau of Reclamation D. Colo. 2017	Five environmental groups challenged the BOR's approvals for a project facilitating the diversion of water from the Colorado River to fill a 90,000 acre-foot reservoir on Colorado's Front Range.	BOR failed to consider alternatives and failed to take a hard look by considering the best available science, including to fully analyze the potential impacts of climate change on water availability for the project.
American Bird Conservancy v. Disbrow D.D.C. 2017	Two bird conservation groups challenged the DOI's installation and operation of a wind turbine project on the shore of Lake Erie, in Ottawa County, Ohio—which is located in a major bird migration corridor, particularly bald eagles.	DOI failed to altogether consider the impact of its decision with climate change.
Center for Biological Diversity v. U.S. Bureau of Land Management D. Nev.	Center for Biological Diversity and Sierra Club challenged the BLM's authorization of an oil and gas lease sale for 195,732 acres of federal estate in Nevada.	BLM failed to take a hard look at the direct, indirect, and cumulative impacts of oil and gas development on greenhouse gas emissions and climate change.

Western Organization of Resource Councils v. U.S. Bureau of Land Management D. Mont. 2017	A collection of environmental groups challenged the BLM's resource management plans for areas in Montana and Wyoming in the Powder River Basin.	BLM failed to consider reasonable alternatives that would allow less coal leasing and mitigation of methane emissions from oil and gas development; and failed to take a hard look by considering the indirect impacts from downstream combustion of fossil fuels and methane pollution; and to consider cumulative climate impacts.
Sierra Club v. Department of Energy D.C. Cir. 2016	Sierra Club challenged the U.S. Department of Energy's (DOE) authorizations to export liquefied natural gas from the Cove Point LNG Terminal in Maryland.	DOE failed to take a hard look by adequately considering indirect and cumulative impacts, including the induced natural gas production and increased coal consumption as indirect effects of its action and the consider the downstream impacts, including end users' combustion of the exported gas; and to use the best available science.
Kane County, Utah v. Jewell D. Utah 2016	Two rural Utah counties and a nonprofit group challenged the DOI's moratorium on federal coal leasing.	DOI order that imposed a moratorium on federal coal leasing while BLM prepared a programmatic environmental impact statement (EIS) addressing climate change.
EnerVest, Ltd. v. Jewell D. Utah 2016	An oil and gas producer with federal oil and gas leasehold interests in the Uinta Basin challenged the BLM's lack of grant applications for permits to drill, in seeking to compel the BLM to grant ten applications for permit to drill.	BLM altogether failed to conduct an environmental review to provide information explaining why the applications for permits would not be approved because new guidance from the Council on Environmental Quality had issued regarding the assessment of impacts on greenhouse gas emissions had rendered analysis in its 2010 environmental impact statement and record of decision inadequate. * Another unique case at the tail end of Obama administration.

Whitewater Draw Natural Resource Conservation District v. Johnson S.D. Cal. 2016	Arizona conservation districts, conservation district officials, nonprofit groups with missions to reduce or stabilize population growth and reduce immigration, and members of such organizations challenged DHS immigration actions. -- Obama Administration Immigration Actions	DHS altogether failed to conduct an environmental review of its action on the impact of carbon dioxide emissions increasing due to "immigration-driven population growth" and that emissions associated with immigration to the U.S. were equal to five percent of the increase in global emissions since 1980. *Another unique case
WildEarth Guardians v. Zinke D.D.C. 2016	WildEarth Guardians and Physicians for Social Responsibility challenged the DOI and BLM's decisions to vacate authorizations for almost 400 oil and gas leases on public lands in three	BLM failed to altogether prepare an environmental impact statement that analyzed climate effects associated with the specific leasing authorizations and approving drilling applications as well as with oil and gas leasing at a programmatic level.
Resource Renewal Institute v. National Park Service N.D. Cal. 2016	Resource Renewal Institute Action challenged the National Park Service's (NPS) issuance of agricultural leases and special use permits on land at the Point Reyes National Seashore, California.	NPS failed to take a hard look by informing the public on its decision to continue authorizing livestock ranching on the National Seashore without including the best available science preparation of a new or revised General Management Plan for the Point Reyes National Seashore that fully addressed the direct, indirect, and cumulative impacts of livestock ranching and climate
Center for Biological Diversity v. Federal Highway Administration C.D. Cal. 2016	Four environmental groups challenged the Federal Highway Administration's (FHWA's) approval of a highway project in Riverside County, California.	FHWA failed to consider a reasonable range of alternatives, including certain alternatives that could reduce greenhouse gas emissions; to take a hard look by disclosing, considering, and evaluating environmental impacts, including the indirect and cumulative impacts of increased greenhouse gas emissions from all sources, including building materials, truck hauls, and water trucks and etc.

Institute for Fisheries Resources v. Burwell N.D. Cal. 2016	Institute for Fisheries Resources challenged the U.S. Food and Drug Administration's (FDA) approval of a novel genetically engineered salmon for human consumption.	FDA failed to take a hard look by adequately considering the cumulative effects related to climate change, including habitat changes due to climate change and how these impacts accumulate with the impacts of existing and/or reasonably foreseeable plans to expand production beyond the sites
Idaho Conservation League v. U.S. Forest Service D. Idaho 2016	Three Idaho environmental groups challenged the USFS's approval of a mine exploration project in Boise National Forest, Idaho.	USFS failed to altogether consider the risk due to climate change, with regards to the impacts on Sacajawea's bitterroot, home to the world's largest populations of this flower.
Vaughn v. Federal Aviation Administration D.C. Cir. 2016	Vaughn challenged the Federal Aviation Administration's (FAA) environmental review of the SoCal Metroplex project, which included a plan to redesign air-traffic control procedures and flight paths at	FAA failed to take a hard look at the indirect and cumulative impacts of the plan and climate change, including glossing over the fact that 42 megatons of expected greenhouse gas emissions associated with the project was "de minimus" and would not have a significant effect on climate.
Catskill Mountainkeeper, Inc. v. Federal Energy Regulatory Commission 2d Cir. 2016	Catskill Mountainkeeper, Clean Air Council and Sierra Club, and other environmental groups challenged the FERC's orders authorizing the Constitution Pipeline Project, a natural gas transmission line that would travel through Pennsylvania and New York.	FERC failed to take a hard look by considering the direct impacts, of reasonably foreseeable increased gas production, the indirect impacts, particularly impacts of natural gas development induced by the project, and cumulative impacts did not capture harms to the future from additional greenhouse gas emissions and climate change.

Sierra Club v. Federal Energy Regulatory Commission D.C. Cir. 2016	Sierra Club, Flint Riverkeeper, and Chattahoochee Riverkeeper challenged the FERC's orders authorizing construction and operation of a natural gas pipeline project extending from Alabama to	FERC failed to take a hard look by considering the pipeline's indirect and cumulative climate impacts, including the impacts of power plants supplied by the pipeline and downstream impacts of increased greenhouse gas emissions.
Western Watersheds Project v. Schneider D. Idaho 2016	Four environmental organizations challenged the USFS and BLM's approvals of revised land use plans for lands located in the range of the greater sage-grouse in Idaho and surrounding states.	USFS and BLM failed to take a hard look by implementing the best available science, which included the synergistic impacts of climate change and human activities on their habitat.
Sierra Club v. U.S. Department of Energy D.C. Cir.	Sierra Club challenged the DOE's authorization to export liquefied natural gas (LNG) from the Sabine Pass terminal in Cameron Parish, Louisiana, to non-free trade agreement nations.	DOE failed to altogether consider climate impacts caused by its authorization.
Sierra Club v. United States Department of Energy D.C. Cir. 2016	Sierra Club challenged the DOE's approval of three applications to export LNG from a facility in Louisiana.	DOE failed to take a hard look by conducting the indirect and cumulative impacts with a more localized analysis of where exports would result in increased LNG production and greenhouse gas emissions.
Alliance for the Wild Rockies v. Pena E.D. Wash. 2016	Alliance for the Wild Rockies challenged the USFS's approval of a restoration, logging, and timber sale in the Colville National Forest.	USFS failed to take a hard look by analyzing or disclose the best available science, which included logging activities as a contributor to reduced carbon stocks in forests and increases in greenhouse gas emissions and to consider the cumulative impacts of climate change.

Sierra Club v. United States Department of Energy D.C. Cir. 2016	Sierra Club challenged the DOE's approval of and application to export LNG from facility in Corpus Christi, Texas.	DOE failed to take hard look at the indirect and cumulative impacts of export-induced gas production, induced domestic coal consumption, and the climate impacts of induced gas production with the future impacts of emissions.
Oregon Wild v. Cummins D. Or. 2015	Oregon Wild challenged the USFS's decision to authorize continued livestock grazing on forest lands in the Upper Klamath Basin.	USFS failed to take a hard look by supplement its analysis with the best available science, including new FWS reports describing climate change and drought posed threats to endangered fish species; and to consider the indirect and cumulative impacts on climate change.
Center for Biological Diversity v. Bureau of Ocean Energy Management C.D. Cal. 2015	Environmental Defense Center and the Center for Biological Diversity challenged the BOEM and the Bureau of Safety and Environmental Enforcement's (BSEE) approval of drilling permit applications, including hydraulic fracturing within the Pacific Outer Continental Shelf.	BOEM and BSEE failed to altogether consider the impacts of its approval on greenhouse gas emissions and climate change, including to analyze the potential impacts of certain well-stimulation practices including hydraulic fracturing.
WildEarth Guardians v. Zinke D. Wyo. 2015	WildEarth Guardians challenged the DOI's approval of mining plan authorizing federal coal development at the Black Thunder Mine in Wyoming's Powder River Basin.	DOI failed to notify the public of the agency's decision; to take a hard look by considering the best available science, including significant new information about mining's impacts on climate change.

Montana Environmental Information Center v. U.S. Office of Surface Mining D. Mont. 2015	Three environmental groups challenged the BLM's mining plan modifications for a 7,000 acre expansion of the Bull Mountains Mine No. 1, an underground coal mine in central Montana—which is the largest domestic source by annual production of underground coal.	BLM failed to take a hard look at the indirect and cumulative effects of coal transportation, coal exports, coal combustion, and the foreseeable greenhouse gas emission and climate change impacts.
Diné Citizens Against Ruining Our Environment v. Bernhardt D.N.M. 2015	Diné Citizens Against Ruining Our Environment challenged the BLM's approval of more than 300 applications for permits to drill wells in the Mancos Shale in the San Juan Basin.	BLM failed to properly tier its environmental assessments to a resource management plan and environmental impact statement; and to take a hard look at the indirect and cumulative impacts, by including using the best available science statistics that do not downplay impacts
Sierra Club v. Federal Energy Regulatory Commission D.C. Cir. 2015	Sierra Club challenging FERC's environmental review for a LNG project in Corpus Christi, Texas.	FERC failed to take a hard look at the indirect and cumulative effects of the project's impacts on climate change.
WildEarth Guardians v. Jewell D.N.M. 2015	WildEarth Guardians challenged the Office of Surface Mining Reclamation and Enforcement (OSMRE) approval of a mining plan for 640 acres of a coal lease in New Mexico.	OSMRE failed to provide the public with necessary information, including contracts for providing coal to certain generating stations and power plants; and to take a hard look at direct, indirect, and cumulative impacts of mining, greenhouse emissions, and climate

AquAlliance v. U.S. Bureau of Reclamation E.D. Cal. 2015	AquAlliance challenged the BOR's water transfer program for the Sacramento/ San Joaquin Delta.	BOR failed to altogether to consider its program's impacts with declines in snowpack and streamflow due to climate change.
WildEarth Guardians v. Zinke D. Utah 2015	WildEarth Guardians challenged DOI's environmental review of a project.	DOI failed to take a hard look by including the best available science, including significant new information about climate change.
WildEarth Guardians v. Jewell D. Colo. 2015	WildEarth Guardians challenged the DOI and OSMRE of Surface Mining, Reclamation and Enforcement's approval of mining plan for development of federally owned coal in Colorado.	DOI and OSMRE failed to take a hard look by considering the best available science to address reasonably foreseeable carbon dioxide emissions and climate impacts; and to consider the direct, indirect, and cumulative climate impacts resulting from mining, burning, and transporting coal, and the climate
Sierra Club v. U.S. Department of Energy D.C. Cir. 2015	Sierra Club challenged the DOE's authorization of an export of LNG from the Freeport Terminal on Quintana Island, Texas	DOE failed to take a hard look at the indirect and cumulative effects, including impacts of other pending and anticipated LNG export approvals, pertaining to increased gas production, the upstream and downstream emissions of carbon dioxide and methane from producing, transporting, and exporting LNG; to use the best available science, as DOE relied on another supplemental report to justify
WildEarth Guardians v. Jewell D. Utah 2015	WildEarth Guardians challenged the BLM and USFS's approvals of leases to expand and extend the life of the Skyline Mine, an underground coal mine in Utah.	BLM and USFS failed to take a hard look by obtaining the best available science, instead of reliance on a 15 years old report; and to consider the direct and indirect impacts, associated with coal mining, transport, and burning, and cumulative climate impacts of similar mining approvals, proposals, and climate

Pacificans for a Scenic Coast v. Federal Highway Administration N.D. Cal. 2015	Three environmental advocacy organizations challenged the FHA's authorization of a freeway widening project in the City of Pacifica, California.	FHA failed to take a hard look at the indirect and cumulative impacts of the project on greenhouse gas emissions and climate change.